CHAPTER 21

AIR CONDITIONING

LIST OF EFFECTIVE PAGES

N, R or D indicates pages which are New, Revised or Deleted respectively.

Remove and insert the affected pages and complete the Record of Revisions and the Record of Temporary Revisions as necessary.

CHAPTER 21

AIR CONDITIONING

LIST OF EFFECTIVE PAGES

N, R or D indicates pages which are New, Revised or Deleted respectively.

Remove and insert the affected pages and complete the Record of Revisions and the Record of Temporary Revisions as necessary.

CH/SE/SU	C	PAGE	DATE	CH/SE/SU	C	PAGE	DATE
21-00-00		28	Mar 27/97	21-00-00		508	May 30/77
21-00-00		29	Mar 27/97	21-00-00		509	May 30/77
21-00-00		30	Mar 27/97	21-00-00		510	May 30/77
21-00-00		31	Mar 27/97	21-00-00		511	May 30/77
21-00-00		32	Mar 27/97	21-00-00		512	May 30/77
21-00-00		33	May 30/81	21-00-00		513	Nov 30/77
21-00-00		34	Mar 27/97	21-00-00		514	May 30/77
21-00-00		35	May 30/81	21-00-00		515	May 30/77
21-00-00		36	Mar 27/97	21-00-00		516	May 30/77
21-00-00		37	Mar 31/98	21-00-00		517	May 30/77
21-00-00		38	Mar 30/81	21-00-00		518	May 30/77
21-00-00		39	Mar 27/97	21-00-00		519	May 30/77
21-00-00		40	Mar 27/97	21-00-00		520	May 30/77
21-00-00		41	Mar 31/98	21-00-00		521	May 30/77
21-00-00		42	Mar 27/97	21-00-00		522	May 30/77
21-00-00		43	Mar 31/98	21-00-00		523	May 30/77
21-00-00		44	Mar 27/97	21-00-00		524	May 30/77
21-00-00		45	May 30/81	21-00-00		525	May 30/77
21-00-00		46	Mar 27/97				
21-00-00		47	Mar 27/97	21-10-00		1	Aug 30/75
21-00-00		48	Mar 27/97	21-10-00		2	Aug 30/75
21-00-00		49	May 30/81	21-10-00		3	Aug 30/75
21-00-00		50	May 30/81	21-10-00		4	Aug 30/75
21-00-00		51	Mar 27/97	21-10-00		5	Aug 30/75
21-00-00		52	Mar 27/97	21-10-00		401	Feb 29/76
21-00-00		53	Mar 31/98	21-10-00		402	May 30/76
21-00-00		54	May 30/81	21-10-00		403	Mar 27/97
21-00-00		55	Mar 27/97	21-10-00		404	May 30/76
21-00-00		56	Mar 27/97	21-10-00		405	May 30/76
21-00-00		301	May 30/76	21-10-00		406	Nov 30/75
21-00-00		302	Feb 29/76	21-10-00		407	Nov 30/75
21-00-00		303	May 30/76	21-10-00		408	Nov 30/75
21-00-00		304	Feb 29/76	21-10-00		409	May 30/76
21-00-00		305	May 30/76	21-10-00		410	May 30/76
21-00-00		306	Feb 29/76	21-10-00		411	May 30/76
21-00-00		307	May 30/76	21-10-00		412	Feb 29/76
21-00-00		308	Feb 29/76	21-10-00		413	May 30/76
21-00-00		401	May 30/76	21-10-00		414	May 30/76
21-00-00		402	May 30/76	21-10-00		415	May 30/76
21-00-00		403	May 30/76	21-10-00		416	May 30/76
21-00-00		404	May 30/76	21-10-00		417	May 30/76
21-00-00		405	May 30/76	21-10-00		418	May 30/76
21-00-00		501	Aug 30/77	21-10-00		419	May 30/76
21-00-00		502	Aug 30/77	21-10-00		420	May 30/76
21-00-00		503	Aug 30/77	21-10-00		421	May 30/76
21-00-00		504	Aug 30/77	21-10-00		422	May 30/76
21-00-00		505	Aug 30/77	21-10-00		423	May 30/76
21-00-00		506	Aug 30/77	21-10-00		424	May 30/76
21-00-00		507	Aug 30/77	21-10-00		425	May 30/76

CH/SE/SU	C	PAGE	DATE	CH/SE/SU	C	PAGE	DATE
21-10-00		426	May 30/76	21-10-00		805	Sep 30/86
21-10-00		427	May 30/76	21-10-00		806	Sep 30/86
21-10-00		428	May 30/76	21-10-00		807	Feb 28/78
21-10-00		429	May 30/76	21-10-00		808	Feb 28/78
21-10-00		430	May 30/76	21-10-00		809	Sep 30/86
21-10-00		431	May 30/76	21-10-00		810	Sep 30/91
21-10-00		432	May 30/76				
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21-10-00		434	May 30/76	21-11-00		2	Feb 28/77
21-10-00		435	May 30/76	21-11-00		3	Aug 30/76
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21-10-00		437	May 30/76	21-11-00		5	May 30/76
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21-10-00		439	May 30/76	21-11-00		7	Aug 30/76
21-10-00		440	May 30/76	21-11-00		8	May 30/76
21-10-00		441	May 30/76	21-11-00		9	Aug 30/76
21-10-00		442	May 30/76	21-11-00		10	Aug 30/76
21-10-00		443	May 30/76	21-11-00		11	Aug 30/76
21-10-00		444	May 30/76	21-11-00		12	Aug 30/76
21-10-00		445	May 30/76	21-11-00		13	Aug 30/76
21-10-00		446	May 30/76	21-11-00		14	Aug 30/76
21-10-00		447	May 30/76	21-11-00		15	May 30/76
21-10-00		448	May 30/76	21-11-00		16	May 30/76
21-10-00		449	May 30/76	21-11-00		17	Aug 30/76
21-10-00		450	Sep 30/86	21-11-00		18	Aug 30/76
21-10-00		451	Sep 30/90	21-11-00		19	Aug 30/76
21-10-00		501	Jun 30/75	21-11-00		20	Aug 30/76
21-10-00		502	Aug 30/75	21-11-00		21	Aug 30/76
21-10-00		503	Aug 30/75	21-11-00		22	Aug 30/76
21-10-00		504	Aug 30/75	21-11-00		23	May 30/76
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21-10-00		506	Aug 30/75	21-11-00		25	Aug 30/76
21-10-00		507	Aug 30/75	21-11-00		26	Aug 30/76
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21-10-00		510	Aug 30/75	21-11-00		29	Aug 30/76
21-10-00		511	Aug 30/75	21-11-00		30	Aug 30/76
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21-10-00		513	Aug 30/75	21-11-00		32	Aug 30/76
21-10-00		514	Feb 28/71	21-11-00		33	Aug 30/76
21-10-00		515	Aug 30/75	21-11-00		34	May 30/76
21-10-00		516	Aug 30/75	21-11-00		35	May 30/76
21-10-00		517	Aug 30/75	21-11-00		36	Mar 27/97
21-10-00		518	Aug 30/75	21-11-00		37	May 30/76
21-10-00		519	Aug 30/75	21-11-00		38	Aug 30/76
21-10-00		801	Feb 28/78	21-11-00		39	Aug 30/76
21-10-00		802	Feb 28/77	21-11-00		40	May 30/76
21-10-00		803	Feb 28/77	21-11-00		41	Nov 30/79
21-10-00		804	Feb 28/77	21-11-00		42	May 30/76

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21-11-00		43	May 30/76	21-11-00		92	May 30/76
21-11-00		44	May 30/76	21-11-00		93	May 30/76
21-11-00		45	May 30/76	21-11-00		94	May 30/76
21-11-00		46	May 30/76	21-11-00		95	May 30/76
21-11-00		47	Nov 30/79	21-11-00		96	May 30/76
21-11-00		48	May 30/76	21-11-00		97	May 30/76
21-11-00		49	May 30/76	21-11-00		98	May 30/76
21-11-00		50	May 30/76	21-11-00		99	May 30/76
21-11-00		51	May 30/76	21-11-00		A0	May 30/76
21-11-00		52	May 30/76	21-11-00		A1	May 30/76
21-11-00		53	May 30/76	21-11-00		A2	May 30/76
21-11-00		54	May 30/76	21-11-00		A3	May 30/76
21-11-00		55	May 30/76	21-11-00		A4	May 30/76
21-11-00		56	May 30/76	21-11-00		A5	May 30/76
21-11-00		57	May 30/76	21-11-00		A6	May 30/76
21-11-00		58	May 30/76	21-11-00		101	Mar 31/99
21-11-00		59	May 30/76	21-11-00		102	Mar 31/99
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21-11-00		61	May 30/76	21-11-00		104	May 30/77
21-11-00		62	May 30/76	21-11-00		105	May 30/77
21-11-00		63	May 30/76	21-11-00		106	May 30/77
21-11-00		64	May 30/76	21-11-00		107	May 30/77
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21-11-00		67	May 30/76	21-11-00		110	Sep 30/87
21-11-00		68	May 30/76	21-11-00		111	Sep 30/87
21-11-00		69	May 30/76	21-11-00		112	May 30/77
21-11-00		70	May 30/76	21-11-00		113	May 30/77
21-11-00		71	May 30/76	21-11-00		114	May 30/77
21-11-00		72	May 30/76	21-11-00		115	May 30/77
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21-11-00		74	May 30/76	21-11-00		117	May 30/77
21-11-00		75	May 30/76	21-11-00		118	May 30/77
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21-11-00		87	May 30/76	21-11-00		130	May 30/77
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21-11-00		89	May 30/76	21-11-00		132	May 30/77
21-11-00		90	May 30/76	21-11-00		133	May 30/77
21-11-00		91	May 30/76	21-11-00		134	May 30/77

CH/SE/SU	C	PAGE	DATE	CH/SE/SU	C	PAGE	DATE
21-11-00		135	May 30/77	21-11-15		402	Nov 30/75
21-11-00		136	May 30/77	21-11-15		403	Nov 30/75
21-11-00		137	May 30/77	21-11-16		401	Nov 30/75
21-11-00		138	May 30/77	21-11-16		402	Nov 30/75
21-11-00		139	May 30/77	21-11-16		403	Nov 30/75
21-11-00		140	May 30/77	21-11-16		501	Feb 29/76
21-11-00		141	May 30/77	21-11-16		502	Feb 29/76
21-11-00		142	May 30/77	21-11-16		503	Sep 29/89
21-11-00		143	May 30/77	21-11-16		504	Sep 29/89
21-11-00		144	May 30/77	21-11-17		401	Nov 30/75
21-11-00		145	May 30/77	21-11-17		402	Feb 28/81
21-11-00		146	May 30/77	21-11-17		403	Aug 30/75
21-11-00		147	May 30/77	21-11-17		501	Feb 29/76
21-11-00		148	May 30/77	21-11-17		502	Feb 29/76
21-11-00		149	May 30/77	21-11-17		503	May 30/78
21-11-00		150	May 30/77	21-11-18		601	Feb 29/76
21-11-00		151	May 30/77	21-11-41		401	Aug 30/77
21-11-00		152	May 30/77	21-11-41		402	Aug 30/77
21-11-00		153	May 30/77	21-11-41		403	May 30/77
21-11-00		154	Aug 30/78	21-11-42		401	Aug 30/77
21-11-00		155	Aug 30/78	21-11-42		402	May 30/77
21-11-00		156	May 30/77	21-11-42		403	Aug 30/77
21-11-00		157	May 30/77	21-11-42		601	Aug 30/77
21-11-11		401	May 30/80	21-11-62		401	Nov 30/75
21-11-11		402	Sep 30/90	21-11-62		402	Mar 27/97
21-11-11		403	May 30/77	21-11-62		501	May 30/76
21-11-11		501	Feb 28/81	21-11-62		502	May 30/76
21-11-11		502	May 30/80	21-11-62		503	May 30/76
21-11-11		503	Mar 31/98	21-11-62		504	May 30/76
21-11-12		401	May 30/77	21-11-62		505	May 30/76
21-11-12		402	May 30/77	21-11-63		401	Aug 30/77
21-11-12		501	May 30/80	21-11-63		402	Aug 30/77
21-11-12		502	May 30/76	21-11-63		403	Mar 27/97
21-11-13		401	Feb 29/76				
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21-11-13		403	May 30/77	21-12-00		2	Aug 30/76
21-11-13		501	Feb 29/76	21-12-00		3	Feb 29/76
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21-11-13		503	Feb 29/76	21-12-00		5	Nov 30/75
21-11-13		504	Feb 29/76	21-12-00		6	Nov 30/75
21-11-14		401	Feb 29/76	21-12-00		7	May 30/77
21-11-14		402	Sep 30/90	21-12-00		8	May 30/77
21-11-14		403	May 30/77	21-12-00		9	May 30/77
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21-11-14		501	Aug 30/75	21-12-00		11	May 30/77
21-11-14		502	Aug 30/75	21-12-00		12	May 30/77
21-11-14		503	Aug 30/75	21-12-00		13	May 30/77
21-11-14		504	Sep 29/89	21-12-00		14	May 30/77
21-11-15		401	Nov 30/75	21-12-00		15	Nov 30/85

CH/SE/SU	C	PAGE	DATE	CH/SE/SU	C	PAGE	DATE
21-12-00		16	Nov 30/85	21-12-00		128	May 30/76
21-12-00		17	Mar 31/99	21-12-00		129	May 30/76
21-12-00		18	Mar 31/99	21-12-00		130	May 30/76
21-12-00		19	May 30/77	21-12-00		131	Feb 28/77
21-12-00		20	Nov 30/75	21-12-00		132	May 30/76
21-12-00		21	Nov 30/85	21-12-00		133	May 30/76
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21-12-00		23	Nov 30/79	21-12-00		135	May 30/76
21-12-00		24	May 30/76	21-12-00		136	May 30/76
21-12-00		25	Mar 27/97	21-12-00		137	May 30/76
21-12-00		26	Nov 30/79	21-12-00		138	May 30/76
21-12-00		27	Nov 30/79	21-12-00		139	May 30/76
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21-12-00		29	May 30/76	21-12-00		141	May 30/76
21-12-00		30	May 30/76	21-12-00		142	May 30/76
21-12-00		31	Nov 30/79	21-12-00		143	May 30/76
21-12-00		32	Nov 30/79	21-12-00		144	May 30/76
21-12-00		33	May 30/76	21-12-00		145	May 30/76
21-12-00		34	Nov 30/76	21-12-00		146	May 30/76
21-12-00		35	Nov 30/79	21-12-00		147	May 30/76
21-12-00		36	Sep 30/90	21-12-00		148	May 30/76
21-12-00		37	Nov 30/76	21-12-00		149	May 30/76
21-12-00		101	May 30/76	21-12-00		150	May 30/76
21-12-00		102	May 30/76	21-12-00		151	May 30/76
21-12-00		103	May 30/76	21-12-00		152	May 30/76
21-12-00		104	May 30/76	21-12-00		153	May 30/76
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21-12-00		110	May 30/76	21-12-00		159	May 30/76
21-12-00		111	May 30/76	21-12-00		160	May 30/76
21-12-00		112	May 30/76	21-12-00		161	May 30/76
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21-12-00		122	May 30/76	21-12-00		171	May 30/76
21-12-00		123	May 30/76	21-12-00		172	May 30/76
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21-12-00		125	May 30/76	21-12-00		174	May 30/76
21-12-00		126	May 30/76	21-12-00		175	May 30/76
21-12-00		127	May 30/76	21-12-00		176	May 30/76

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21-12-00		179	May 30/76	21-12-14		402	Mar 31/99
21-12-00		180	May 30/76	21-12-14		403	Mar 27/97
21-12-11		401	Sep 30/91	21-12-14		404	Mar 27/97
21-12-11		402	May 30/78	21-12-14		405	Mar 27/97
21-12-11		403	May 30/78	21-12-14		501	Feb 28/81
21-12-11		404	Sep 30/91	21-12-14		502	Nov 30/80
21-12-11		405	Feb 28/79	21-12-14		503	Nov 30/80
21-12-11		406	Mar 27/97	21-12-14		601	Feb 29/76
21-12-11		407	Mar 27/97	21-12-14		602	Feb 29/76
21-12-11		408	Feb 28/79	21-12-15		401	Feb 29/76
21-12-11		409	Feb 28/79	21-12-15		402	Feb 29/76
21-12-11		410	Feb 28/79	21-12-15		403	Feb 29/76
21-12-11		411	Feb 28/79	21-12-16		401	Nov 30/75
21-12-11		412	Feb 28/79	21-12-16		402	Nov 30/75
21-12-11		413	Mar 27/97	21-12-16		403	Nov 30/75
21-12-11		414	Feb 28/79	21-12-31		401	Nov 30/75
21-12-11		415	Feb 28/79	21-12-31		402	Feb 29/76
21-12-11		416	Feb 28/79	21-12-32		401	Feb 29/76
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21-12-11		418	May 30/78	21-12-32		403	Feb 29/76
21-12-11		419	May 30/78	21-12-33		401	Feb 29/76
21-12-11		420	May 30/78	21-12-33		402	Feb 29/76
21-12-11		421	Mar 27/97	21-12-33		403	Aug 30/75
21-12-11		422	May 30/78	21-12-33		404	Feb 29/76
21-12-11		423	May 30/79	21-12-33		405	Aug 30/75
21-12-11		424	Sep 30/90	21-12-33		406	Aug 30/75
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21-12-11		426	Feb 28/79	21-12-33		501	May 30/76
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21-12-12		403	Jun 30/75	21-12-35		404	Aug 30/77
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21-12-12		505	Sep 29/89	21-12-35		410	Nov 30/76
21-12-13		401	Nov 30/75	21-12-35		411	Nov 30/81
21-12-13		402	Nov 30/75	21-12-35		412	Feb 28/77

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21-12-35		503	Aug 30/75	21-12-62		602	Feb 29/76
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21-12-61		502	Sep 30/90	21-13-00		22	Sep 30/87
21-12-61		503	Feb 28/77	21-13-00		23	Nov 30/81
21-12-61		504	Feb 28/77	21-13-00		24	Nov 30/81
21-12-61		505	Sep 30/90	21-13-00		25	Nov 30/81
21-12-62		501	Feb 29/76	21-13-00		26	May 30/77
21-12-62		502	Feb 29/76	21-13-00		27	Nov 30/81

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21-13-00		122	May 30/76	21-13-51		404	Mar 29/96
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21-13-00		124	Aug 30/78	21-13-51		501	May 30/76
21-13-00		125	Sep 30/87	21-13-51		502	Mar 27/97

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21-14-00		104	Feb 29/76	21-16-11		402	Nov 30/85
21-14-00		105	Feb 29/76	21-16-11		403	Aug 30/77
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21-15-13		503	May 30/77	21-17-00		23	Nov 30/75
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21-15-15		403	May 30/77	21-17-00		106	Aug 30/76

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21-21-00	02	141	Nov 30/79	21-21-00	02	504	May 30/81
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21-21-00		402	Aug 30/80	21-21-00		803	Nov 30/78
21-21-00		403	Nov 30/77	21-21-00		804	May 30/79
21-21-00		404	Nov 30/77	21-21-00		805	Aug 30/80
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21-21-00		409	Aug 30/80	21-21-11		404	Feb 28/78
21-21-00		410	Mar 31/98	21-21-11		501	Jun 30/75
21-21-00		411	Aug 30/80	21-21-13		401	Nov 30/78
21-21-00		412	Aug 30/80	21-21-13		402	Aug 30/76

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21-21-19	02	502	Mar 27/97
21-21-19	02	503	Aug 30/78
21-21-21		401	Nov 30/75
21-21-21		402	Nov 30/75
21-21-21		403	Nov 30/75
21-21-21		404	Nov 30/75
21-21-21		501	Mar 31/98
21-21-21		502	Mar 31/98
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21-21-22		402	Feb 28/79
21-21-22		403	Feb 28/79
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21-21-22		501	Mar 31/98
21-21-22		502	Mar 31/98
21-21-23		401	Feb 28/79
21-21-23		402	Feb 28/79
21-21-23		403	Feb 28/78
21-21-24		401	Sep 30/93
21-21-24		402	Sep 30/93
21-21-24		403	Sep 30/93
21-21-25		401	Feb 29/80
21-21-25		402	Nov 30/78
21-21-25		403	Feb 29/80
21-21-25		501	Feb 29/80
21-21-25		502	Nov 30/78
21-21-26		401	Feb 28/81
21-21-26		402	Feb 28/81
21-21-26		403	Feb 28/81
21-21-27		401	Feb 29/80
21-21-27		402	Feb 29/80
21-21-27		403	Feb 29/80
21-21-27		501	Feb 29/80
21-21-27		502	Nov 30/78
21-21-29		401	Nov 30/76
21-21-29		402	Nov 30/76
21-21-29		403	Nov 30/76
21-21-29		501	Mar 31/98
21-21-29		502	Mar 31/98
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21-21-53		402	May 30/77
21-21-53		403	Sep 30/90
21-21-53		404	Sep 30/90
21-21-53		501	Mar 31/98
21-21-53		502	Mar 31/98
21-21-53		503	Mar 31/98
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21-21-54		401	May 30/77
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21-21-54		403	May 30/77
21-21-54		404	May 30/77
21-21-55		401	Feb 29/80
21-21-55		402	Nov 30/78
21-21-55		403	Feb 29/80
21-21-55		501	Nov 30/78
21-21-73		401	Mar 29/96
21-21-73		402	Mar 29/96
21-21-80		701	Sep 30/87
21-23-00		1	Jun 30/75
21-23-00		2	Nov 30/78
21-23-00		3	Nov 30/78
21-23-00		101	Nov 30/78
21-23-00		102	Nov 30/78
21-23-00		103	Nov 30/79
21-23-00		501	Aug 30/80
21-23-00		502	Aug 30/80
21-23-00		503	Aug 30/80
21-23-00		504	Aug 30/80
21-23-00		505	Aug 30/80
21-23-00		506	Aug 30/80
21-23-00		507	Sep 30/87
21-23-00		508	Sep 30/91
21-23-00		509	Aug 30/80
21-23-00		601	Nov 30/78
21-23-00		602	Nov 30/78
21-23-11		401	Aug 30/77
21-23-11		402	Aug 30/77
21-23-11		403	Feb 28/78
21-23-11		501	Jan 30/75

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				21-25-00		509	Nov 30/76
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21-24-00		4	Aug 30/79	21-25-00		513	Nov 30/76
21-24-00		5	Aug 30/79	21-25-00		601	Nov 30/79
21-24-00		6	May 30/77	21-25-00		602	Nov 30/79
21-24-00		7	Aug 30/79	21-25-00		603	Nov 30/79
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21-24-00		13	Aug 30/79	21-25-00		801	Sep 29/89
21-24-00		501	Feb 29/76	21-25-00		802	Nov 30/77
21-24-00		502	Mar 27/97	21-25-00		803	Nov 30/77
21-24-00		503	Nov 30/78	21-25-00		804	Nov 30/77
21-24-00		504	Sep 30/87	21-25-00		805	Nov 30/77
21-24-00		801	Mar 27/97	21-25-00		806	Nov 30/77
21-24-11	R	401	Mar 31/00	21-25-00		807	Nov 30/77
21-24-11	R	402	Mar 31/00	21-25-00		808	Nov 30/77
21-24-11		701	Mar 31/99	21-25-00		809	Nov 30/77
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21-24-12		403	Feb 28/77	21-25-21		404	Aug 30/78
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21-24-12		802	Feb 28/77	21-25-21		602	Nov 30/78
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21-24-13		403	Feb 28/77	21-26-00		4	Nov 30/84
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21-25-00		503	Nov 30/75	21-26-00		501	Mar 31/98
21-25-00		504	Aug 30/75	21-26-00		502	Mar 31/98
21-25-00		505	Sep 29/89	21-26-11		401	Aug 30/80
21-25-00		506	Sep 29/79	21-26-11		402	Aug 30/80

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21-26-12		402	Nov 30/75	21-28-00		605	May 30/77
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21-26-12		404	Feb 28/78	21-28-11		402	May 30/77
21-26-13		401	Mar 31/99	21-28-11		403	May 30/77
21-26-13		402	Nov 30/78				
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21-27-00		101	Nov 30/78	21-29-00		605	May 30/77
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21-27-00		105	Nov 30/78	21-30-00		3	May 30/77
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21-27-00		402	Feb 28/78	21-30-00		7	Feb 28/79
21-27-00		501	Nov 30/79	21-30-00		8	Feb 28/81
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21-27-00		503	Nov 30/79	21-30-00		402	Aug 30/76
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21-28-00		601	May 30/77				
21-28-00		602	Mar 31/99	21-33-00		1	May 30/76

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21-33-00		104	Feb 29/76	21-35-00		25	Aug 30/81
21-33-00		105	Feb 29/76	21-35-00		26	Aug 30/81
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21-33-11		501	Aug 30/77	21-35-00		30	Aug 30/81
21-33-11		502	Aug 30/77	21-35-00		31	Aug 30/81
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21-35-00		17	Aug 30/81	21-35-00		127	May 30/80
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21-35-00		132	May 30/80	21-35-11		403	Aug 30/81
21-35-00		133	May 30/80	21-35-11		404	Aug 30/81
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21-35-00		142	May 30/80	21-35-12		401	Sep 30/90
21-35-00		143	May 30/80	21-35-12		402	Mar 31/99
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21-35-00		145	May 30/80	21-35-12		402 B	Sep 30/90
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21-35-00		149	May 30/80	21-35-12		406	Aug 30/81
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21-35-00		516	Aug 30/81	21-35-15		404	May 30/76
21-35-00		517	Aug 30/81	21-35-15		601	May 30/76
21-35-00		518	Aug 30/81	21-35-15		602	Feb 29/76

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21-35-45	02	404	Feb 28/81	21-36-11		403	May 30/80
21-35-45	02	405	Mar 31/99	21-36-11		501	Aug 30/77
21-35-45	02	406	Aug 30/81	21-36-11		502	Aug 30/77
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21-35-47		402	Mar 31/99	21-36-12		501	Sep 30/90
21-35-47		403	May 30/76				
				21-60-00		1	Aug 30/76
21-36-00		1	May 30/76	21-60-00		2	Aug 30/76
21-36-00		2	May 30/76	21-60-00		101	Sep 30/86
21-36-00		3	May 30/76	21-60-00		102	Feb 29/76
21-36-00		4	May 30/76	21-60-00		103	Feb 29/76
21-36-00		5	May 30/76	21-60-00		104	Feb 29/76

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21-60-00		105	Feb 29/76	21-60-00		404	May 30/76
21-60-00		106	Feb 29/76	21-60-00		405	Feb 29/76
21-60-00		107	Feb 29/76	21-60-00		406	May 30/76
21-60-00		108	Feb 29/76	21-60-00		407	May 30/76
21-60-00		109	Feb 29/76	21-60-00		408	Feb 29/76
21-60-00		110	Feb 29/76	21-60-00		409	May 30/76
21-60-00		111	May 30/76	21-60-00		410	May 30/76
21-60-00		112	Feb 29/76	21-60-00		411	May 30/76
21-60-00		113	Feb 29/76	21-60-00		412	May 30/76
21-60-00		114	Feb 29/76	21-60-00		413	May 30/76
21-60-00		115	Feb 29/76	21-60-00		414	May 30/76
21-60-00		116	Feb 29/76	21-60-00		501	Feb 29/76
21-60-00		117	Feb 29/76	21-60-00		502	Feb 29/76
21-60-00		118	Feb 29/76	21-60-00		503	Feb 29/76
21-60-00		119	Feb 29/76	21-60-00		504	Feb 29/76
21-60-00		120	Feb 29/76	21-60-00		505	Feb 29/76
21-60-00		121	Feb 29/76	21-60-00		506	Mar 31/99
21-60-00		122	May 30/76	21-60-00		507	May 30/76
21-60-00		123	Feb 29/76	21-60-00		508	Nov 30/80
21-60-00		124	Feb 29/76	21-60-00		509	May 30/76
21-60-00		125	Feb 29/76	21-60-00		510	May 30/76
21-60-00		126	Feb 29/76	21-60-00		511	Mar 31/99
21-60-00		127	Feb 29/76	21-60-00		512	Mar 31/99
21-60-00		128	Feb 29/76	21-60-00		513	May 30/76
21-60-00		129	Feb 29/76	21-60-00		514	Mar 31/99
21-60-00		130	Feb 29/76	21-60-00		515	Mar 31/99
21-60-00		131	Feb 29/76	21-60-00		516	Mar 31/99
21-60-00		132	Feb 29/76	21-60-00		517	Mar 31/99
21-60-00		133	Feb 29/76	21-60-00		518	May 30/76
21-60-00		134	Feb 29/76	21-60-00		519	May 30/76
21-60-00		135	Feb 29/76	21-60-00		520	May 30/78
21-60-00		136	Feb 29/76	21-60-00		521	May 30/78
21-60-00		137	Feb 29/76	21-60-00		522	May 30/78
21-60-00		138	Feb 29/76	21-60-00		523	May 30/78
21-60-00		139	Feb 29/76	21-60-00		524	May 30/78
21-60-00		140	Feb 29/76	21-60-00		525	May 30/78
21-60-00		141	Feb 29/76	21-60-00		526	May 30/78
21-60-00		142	Feb 29/76	21-60-00		527	May 30/78
21-60-00		143	Feb 29/76	21-60-00		528	May 30/78
21-60-00		144	Aug 30/78	21-60-00		529	May 30/78
21-60-00		145	May 30/76	21-60-00		530	May 30/78
21-60-00		146	May 30/76	21-60-00		531	May 30/78
21-60-00		147	May 30/76	21-60-00		532	May 30/78
21-60-00		148	May 30/76	21-60-00		533	May 30/78
21-60-00		149	May 30/76	21-60-00		534	May 30/78
21-60-00		150	May 30/76	21-60-00		535	May 30/78
21-60-00		401	Nov 30/75	21-60-00		536	May 30/78
21-60-00		402	May 30/76	21-60-00		537	Aug 30/78
21-60-00		403	Feb 29/76	21-60-00		538	May 30/78

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21-60-00		539	May 30/78	21-61-11		403	May 30/77
21-60-00		540	May 30/78	21-61-11		501	Aug 30/77
21-60-00		541	May 30/78	21-61-11		502	Aug 30/77
21-60-00		542	Aug 30/78	21-61-12		401	May 30/76
21-60-00		543	May 30/78	21-61-12		402	May 30/76
21-60-00		544	May 30/78	21-61-12		403	May 30/76
21-60-00		545	May 30/78	21-61-13		401	Nov 30/75
21-60-00		546	May 30/78	21-61-13		402	Nov 30/75
21-60-00		547	Sep 30/93	21-61-13		403	Nov 30/75
21-60-00		548	Sep 30/93	21-61-14		401	Aug 30/77
				21-61-14		402	Aug 30/77
21-61-00		1	Aug 30/76	21-61-14		403	Feb 28/81
21-61-00		2	May 30/76	21-61-15		401	Aug 30/77
21-61-00		3	Aug 30/76	21-61-15		402	Mar 31/99
21-61-00		4	Aug 30/76	21-61-15		403	Feb 28/81
21-61-00		5	Aug 30/76	21-61-15		501	Aug 30/77
21-61-00		6	May 30/76	21-61-15		502	Aug 30/77
21-61-00		7	Aug 30/76	21-61-15		503	Aug 30/77
21-61-00		8	May 30/76	21-61-16		401	Aug 30/77
21-61-00		9	Aug 30/76	21-61-16		402	Mar 31/99
21-61-00		10	May 30/76	21-61-16		403	Feb 28/81
21-61-00		11	Aug 30/76	21-61-16		501	Aug 30/75
21-61-00		12	Aug 30/76	21-61-16		502	Aug 30/75
21-61-00		13	May 30/76	21-61-16		503	Aug 30/75
21-61-00		14	May 30/76	21-61-16		504	Aug 30/75
21-61-00		15	Aug 30/76	21-61-16		505	Aug 30/75
21-61-00		16	May 30/76	21-61-16		506	Aug 30/75
21-61-00		17	Aug 30/76	21-61-16		507	Aug 30/75
21-61-00		18	May 30/76	21-61-16		508	Aug 30/75
21-61-00		19	Aug 30/76	21-61-16		509	Aug 30/75
21-61-00		20	Aug 30/76	21-61-17		401	Nov 30/81
21-61-00		21	May 30/76	21-61-17		402	Mar 31/99
21-61-00		22	May 30/76	21-61-17		403	Feb 28/81
21-61-00		23	Aug 30/76	21-61-18		401	Nov 30/75
21-61-00		24	Aug 30/76	21-61-18		402	Nov 30/75
21-61-00		25	May 30/76	21-61-18		403	Feb 28/81
21-61-00		26	Aug 30/76	21-61-19		401	Aug 30/76
21-61-00		27	May 30/76	21-61-19		402	Feb 28/81
21-61-00		28	May 30/76	21-61-19		403	Nov 30/75
21-61-00		29	Aug 30/76	21-61-21		401	Nov 30/76
21-61-00		30	Aug 30/76	21-61-21		402	Nov 30/76
21-61-00		31	May 30/76	21-61-21		403	Mar 29/96
21-61-00		32	May 30/76	21-61-21		404	Mar 29/96
21-61-00		33	May 30/76	21-61-21		405	Mar 29/96
21-61-00		34	Aug 30/76	21-61-22		401	Nov 30/80
21-61-00		35	Aug 30/76	21-61-22		402	Mar 31/99
21-61-00		601	Aug 30/77	21-61-22		403	Feb 28/81
21-61-11		401	Aug 30/77	21-61-31		401	Nov 30/80
21-61-11		402	Aug 30/77	21-61-31		402	Feb 28/81

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21-61-31		403	Jun 30/75	21-62-00		12	May 30/77
21-61-31		404	Jun 30/75	21-62-00		13	Aug 30/77
21-61-31		405	Jun 30/75	21-62-00		14	Aug 30/77
21-61-31		406	Jun 30/75	21-62-00		15	May 30/77
21-61-31		407	Feb 28/81	21-62-00		16	May 30/77
21-61-31		501	Aug 30/76	21-62-00	R	17	Mar 31/00
21-61-31		502	Aug 30/76	21-62-00	R	18	Mar 31/00
21-61-31		503	Aug 30/76	21-62-00		601	Mar 27/97
21-61-31		504	Aug 30/76	21-62-11		401	Aug 30/77
21-61-31		505	Aug 30/76	21-62-11		501	Aug 30/77
21-61-32		401	May 30/81	21-62-12		401	Mar 27/97
21-61-32		402	May 30/81	21-62-12		402	May 30/77
21-61-32		403	May 30/81	21-62-12		403	Mar 27/97
21-61-32		404	May 30/81	21-62-13		401	Mar 27/97
21-61-32		405	May 30/81	21-62-13		402	May 30/76
21-61-32		501	May 30/81	21-62-13		403	Mar 27/97
21-61-32		502	Jun 30/75	21-62-14		401	Nov 30/80
21-61-32		503	May 30/81	21-62-14		402	Mar 31/99
21-61-32		504	May 30/81	21-62-14		403	Feb 28/81
21-61-32		505	May 30/81	21-62-14		501	Aug 30/77
21-61-32		506	Jun 30/75	21-62-14		502	Aug 30/77
21-61-33		401	May 30/81	21-62-14		503	Aug 30/77
21-61-33		402	May 30/81	21-62-15		401	Aug 30/77
21-61-33		403	May 30/81	21-62-15		402	May 30/77
21-61-33		404	May 30/81	21-62-15		403	Feb 28/81
21-61-34		401	May 30/81	21-62-15		501	Aug 30/77
21-61-34		402	Feb 28/81	21-62-16		401	Aug 30/77
21-61-34		403	Nov 30/77	21-62-17		401	Aug 30/77
21-61-35		401	Nov 30/77	21-62-18		401	May 30/80
21-61-35		402	Feb 28/81	21-62-18		402	May 30/77
21-61-35		403	Nov 30/77	21-62-18		403	Feb 28/81
21-61-36		401	Nov 30/77	21-62-31		401	Nov 30/75
21-61-36		402	Feb 28/81	21-62-31		402	Nov 30/75
21-61-36		403	Nov 30/77	21-62-31		403	Nov 30/75
21-61-37		401	Aug 30/76	21-62-32		401	May 30/76
21-61-37		402	Feb 28/81	21-62-32		402	May 30/76
21-61-37		403	Nov 30/75	21-62-32		403	Nov 30/75
				21-62-41		401	Mar 31/99
21-62-00		1	Aug 30/77	21-62-41		501	Nov 30/81
21-62-00		2	May 30/77	21-62-42		401	Aug 30/77
21-62-00		3	Aug 30/77	21-62-42		501	Nov 30/75
21-62-00		4	May 30/77	21-62-43		401	Nov 30/75
21-62-00		5	Aug 30/77	21-62-44		401	Nov 30/75
21-62-00		6	Aug 30/77	21-62-45		401	Nov 30/75
21-62-00		7	Aug 30/77	21-62-46		401	Aug 30/77
21-62-00		8	Aug 30/77	21-62-47		401	Nov 30/75
21-62-00		9	May 30/77				
21-62-00		10	Nov 30/75	21-63-00		1	Nov 30/80
21-62-00		11	May 30/77	21-63-00		2	May 30/76

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21-63-00		3	May 30/76
21-63-00		4	May 30/76
21-63-00		5	Nov 30/80
21-63-00		6	May 30/76
21-63-00		7	Nov 30/80
21-63-00		8	Nov 30/80
21-63-00		9	Nov 30/80
21-63-00		10	May 30/76
21-63-00		11	Nov 30/80
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21-63-00		18	May 30/76
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21-63-00		20	May 30/76
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21-63-11		401	Aug 30/77
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21-63-12		401	Aug 30/77
21-63-12		402	Mar 31/99
21-63-12		403	Feb 28/81
21-63-12		501	Nov 30/80
21-63-12		502	Nov 30/80
21-63-12		503	Nov 30/80
21-63-13		401	Aug 30/77
21-63-13		402	Mar 31/99
21-63-13		403	Feb 28/81
21-63-13		501	Aug 30/77
21-63-14		401	Aug 30/77
21-63-15		401	Aug 30/77
21-63-16		401	Mar 31/99
21-63-16		402	Mar 31/99
21-63-16		403	Mar 31/99
21-63-21		401	Nov 30/80
21-63-21		402	Nov 30/80
21-63-21		403	Nov 30/80
21-63-21		404	Feb 28/81
21-63-22		401	Mar 27/97
21-63-22		402	Aug 30/80
21-63-22		403	Aug 30/77
21-63-22		404	Mar 27/97
21-63-23		401	Nov 30/75
21-63-23		402	Feb 29/76
21-63-23		403	Nov 30/75
21-63-24		401	Nov 30/75
21-63-25		401	Nov 30/81
21-63-25		402	Aug 30/80
21-63-25		403	Aug 30/77
21-63-25		404	Nov 30/81
21-63-26		401	Nov 30/75
21-63-31		401	Mar 27/97
21-63-31		501	Aug 30/77
21-63-32		401	Aug 30/77
21-63-32		501	Nov 30/75
21-63-33		401	Nov 30/75
21-63-34		401	Nov 30/75
21-63-35		401	Nov 30/75
21-63-36		401	Nov 30/77
21-63-37		401	Nov 30/75
21-63-38		401	Aug 30/77
21-63-39		401	Nov 30/75

SERVICE BULLETIN LIST

In the following service bulletin list, SB indicates an aircraft manufacturers bulletin, AEB indicates an airline engineering bulletin and OL indicates an engine manufacturers bulletin (complete identification OL.593-XX-XXX).

SB/AEB NO	REV	INC. IN REVISION	DESCRIPTION
SB 21-001			No effect Air conditioning -Standardization of electrical connectors for each type of high temperature valves
SB 21-001	01		No effect Air conditioning -Standardization of electrical connectors for each type of high temperature valves.
SB 21-002			Embodied Air conditioning -Modification to pressure bleed and limitation valve to improve reliability
SB 21-003			No effect Air conditioning -Modification of the ground air conditioning receptacle base
SB 21-003	01		No effect Air conditioning -Modification of the ground air conditioning receptacle base
SB 21-003	02		No effect Air Conditioning-Modification to the ground air conditioning receptacle base
SB 21-004			No effect Air conditioning -Pressure and flow limiting -To introduce mechanically attached harness support brackets in lieu of welded brackets
SB 21-004	01		No effect Air conditioning -Pressure and flow limiting -To introduce mechanically attached harness support brackets in lieu of welded brackets
SB 21-004	02		No effect Air conditioning -Pressure and flow limiting -To introduce mechanically attached harness support brackets in lieu of welded brackets
SB 21-004	03		No effect Air Conditioning:Pressure and flow limiting To introduce mechanically attached electri-

SB/AEB NO	REV	INC. IN REVISION	DESCRIPTION
			cal harness support brackets in lieu of welded brackets
R SB 21-004	04		No effect Air Conditioning:Pressure and flow limiting To introduce mechanically attached electrical harness support brackets in lieu of welded brackets
SB 21-005			No effect Air conditioning. Heat exchanger cooling system -To change the fire valve gate pivot bearing materials
SB 21-005	01		No effect Air conditioning. Heat exchanger cooling system - To change the fire valve gate pivot bearing materials
SB 21-006		Aug 30/76	Embodied Air conditioning.Inertial navigation system ventilation -To change the ventilation failure warning relay
SB 21-006	01	Aug 30/76	Embodied Air conditioning.Inertial navigation system ventilation -To change the ventilation failure warning relay.
SB 21-006	02		No effect Air Conditioning: Inertial Navigation System Ventilation-To change the Ventilation Failure Warning Relay
SB 21-007			Not applicable
SB 21-008			Not applicable
SB 21-009			Embodied Air conditioning. Duct -To ensure correct orientation of the upper clamp of the engine air starter/air conditioning duct(Engine Bays 2 & 4)
SB 21-010		Feb 28/77	Embodied Air conditioning -AFT hydraulic bay fan indicating by means of an electronic speed sensing unit.
SB 21-010	01	Feb 28/77	Embodied Air conditioning -AFT hydraulic bay fan indicating by means of an electronic speed sensing unit
SB 21-010	02		No effect Air Conditioning - Aft hydraulic bay fan

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SB/AEB NO	REV	INC. IN REVISION	DESCRIPTION
			indicating by means of an electronic speed sensing unit
SB 21-011		Aug 30/77	Embodied Air conditioning -Replacement of unions and flexible pipes of cabin pressure control discharge valves and vacuum pumps to prevent transposed couplings
SB 21-011	01		No effect Air conditioning -Replacement of unions and flexible pipes of cabin pressure control discharge valves and vacuum pumps to prevent transposed couplings
SB 21-011	02		No effect Air conditioning -Replacement of unions and flexible pipes of cabin pressure control discharge valves and vacuum pumps to prevent transposed couplings
SB 21-011	03		No effect Air conditioning -Replacement of unions and flexible pipes of cabin pressure control discharge valves and vacuum pumps to prevent transposed couplings
SB 21-012		May 30/77	Embodied Air Conditioning. Extraction System -To introduce a new standard of mass flow duct sensor and to improve the mounting
SB 21-013			No effect Air conditioning. Distribution -To change type of circuit breakers used on rear rack extract fans
SB 21-013	01		No effect Air conditioning. Distribution -To change type of circuit breakers used on rear rack extract fans
SB 21-014			No effect Air Conditioning -Improvement to the stability and accuracy of the air bleed dual temperature indicator.
SB 21-014	01		No effect Air conditioning -Improvement to the stability and accuracy of the air bleed dual temperature indicator.
SB 21-014	02		No effect Air conditioning -Improvement to the stabi-

SERVICE BULLETIN LIST

SB/AEB NO	REV	INC. IN REVISION	DESCRIPTION
			lity and accuracy of the air bleed dual temperature indicator.
SB 21-014	03		No effect Air conditioning -Improvement to the stability and accuracy of the air bleed dual temperature indicator.
SB 21-014	04		No effect Air Conditioning - Improvement to the stability and accuracy of the air bleed dual temperature indicator (JAEGER SB's 153. 21.005 & .006)
SB 21-015			No effect Air conditioning. (Generation). Cable route -Reposition cable clip on air conditioning cables in engine bays 2 & 4
SB 21-015	01		No effect Air conditioning. (Generation). Cable route -Reposition cable clip on air conditioning cables in engine bays 2 & 4
SB 21-015	02		No effect Air Conditioning. (Generation). Cable route - Reposition cable clip on air conditioning cables in Engine Bays 2 & 4
SB 21-016		Nov 30/78	Embodied Air conditioning -Distribution -To change forward rack extraction fans from 2 off operating and 1 standby to 3 off operating
SB 21-016	01		Embodied Air conditioning -Distribution -To change forward rack extraction fans from 2 off operating and 1 standby to 3 off operating
SB 21-016	02		Embodied Air conditioning -Distribution -To change forward rack extraction fans from 2 off operating and 1 standby to 3 off operating
SB 21-016	03		Embodied Air conditioning -Distribution -To change forward rack extraction fans from 2 off operating and 1 standby to 3 off operating
SB 21-016	04		Embodied Air conditioning. Distribution -To change forward rack extraction fans from 2 off operating and 1 standby to 3 off operating
SB 21-016	05		No effect

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SB/AEB NO	REV	INC. IN REVISION	DESCRIPTION
			Air conditioning. Distribution -To change forward rack extraction fans from 2 off operating and 1 standby to 3 off operating
SB 21-016	06		No effect
			Air conditioning. Distribution -To change forward rack extraction fans from 2 off operating and 1 standby to 3 off operating
SB 21-016	07		Embodied
			Air conditioning. Distribution -To change forward rack extraction fans from 2 off operating and 1 standby to 3 off operating
SB 21-016	08		Embodied
			Air conditioning. Distribution -To change forward rack extraction fans from 2 off operating and 1 standby to 3 off operating
SB 21-017		Aug 30/76	Embodied
			Air conditioning. Fuel tank 11 ventilation system - Negative pressure check of ducting and temporary repair scheme
SB 21-017	01		Embodied
			Air conditioning. Fuel tank 11 ventilation system - Negative pressure check of ducting and temporary repair scheme
SB 21-017	02		No effect
			Air conditioning. Fuel tank 11 ventilation system -To improve the system for the forward tank wall.
SB 21-018			No effect
			Air conditioning. Rear extraction -Sealing of rear electronic rack cooling ducts.
SB 21-018	01		No effect
			Air conditioning. Rear extraction -Sealing of rear electronic rack cooling ducts.
SB 21-018	02		No effect
			Air conditioning. Rear extraction -Sealing of rear electronic rack cooling ducts.
SB 21-019			No effect
			Improve installation of the fuel heat exchanger (group 1) in the wing.
SB 21-019	01		No effect
			Air Conditioning - Improve installation of the Fuel Heat Exchanger (Group 1) in the wing
SB 21-020			No effect

SB/AEB NO	REV	INC. IN REVISION	DESCRIPTION
			Air conditioning -To securely safety the adjuster assembly of the air bleed över-pressure switch
SB 21-020	01		No effect Air conditioning -To securely safety the adjuster assembly of the air bleed over-pressure switch
SB 21-020	02		No effect Air conditioning -To securely safety the adjuster assembly of the air bleed over-pressure switch
SB 21=021			Embodied Air conditioning -Improvement to oil level reading and oil level filling for C.A.U.
SB 21-022		Feb 28/77	Embodied Air conditioning system -Elimination of electrical interferences in master control unit
SB 21-022	01		No effect Air Conditioning system -Elimination of electrical interferences in master control unit
SB 21-022	02		No effect Air Conditioning System - Elimination of electrical interference in Master Control Unit (HAWKER SIDDELEY DYNAMICS LTD SB A213265A-21-1)
R SB 21-022	03		No effect Air conditioning - Elimination of electrical interferences in master control unit
SB 21-023			No effect Air Conditioning -Compression of air conditioning duct heat insulation material at support struts in beam between Frame 54 and Frame 60
SB 21-023	01		No effect Air Conditioning -Compression of air conditioning duct heat insulation material at support struts in beam between Frame 54 and Frame 60
SB 21-023	02		No effect Air Conditioning -Compression of air conditioning duct heat insulation material at support struts in beam between Frame 54

	SB/AEB NO	REV	INC. IN REVISION	DESCRIPTION
				and Frame 60
R	SB 21-023	03		No effect Air Conditioning -Compression of air conditioning duct heat insulation material at support struts in beam between Frame 54 and Frame 60
	SB 21-024			No effect Air conditioning -Cold air unit -Correction on label located on compressor outlet duct
	SB 21-025			No effect Air Conditioning -Inspection of changeover valve and introduction of improved self aligning mechanism
	SB 21-025	01		No effect Air Conditioning -Inspection of changeover valve and introduction of improved self-aligning mechanism
	SB 21-026		Feb 28/77	Embodied Air Conditioning -Air extraction -Removal of "O" ring seals at rear extraction fan inlets
	SB 21-027			Embodied Distribution to replace rear rack extraction and forward rack supply fans by fans with oilwick lubricated bearings
	SB 21-027	01		Applicable Air Conditioning. Distribution - To replace rear rack extraction and forward rack supply fans by fans with oil wick lubricated bearings
	SB 21-027	02		Applicable Air Conditioning. Distribution - To replace rear rack extraction and forward rack supply fans by fans with oil wick lubricated bearings
	SB 21-028			No effect Air Conditioning. Distribution -To change type of circuit breakers used on forward rack supply fans
	SB 21-029		Feb 28/78	Embodied Air Conditioning.Rear Equipment Bay Purging Improved Fan mounting strap
	SB 21-030			Embodied

	SB/AEB NO	REV	INC. IN REVISION	DESCRIPTION
				Air Conditioning -Inhibition of the water separator by-pass valve control (in closed position) on air conditioning group 1
	SB 21-031			No effect Air conditioning -Lengthen rack on cabin temperature control valve feedback lever
	SB 21-032			No effect Air Conditioning.Rear Equipment Bay Purging To introduce metal pipe restraints at frame 80
R	SB 21-032	01		No effect Air Conditioning.Rear Equipment Bay Purging To introduce metal pipe restraints at frame 80
	SB 21-033			No effect Air Conditioning.Pressure and Flow Limiting To introduce a new blanking cap for sensing system test points
	SB 21-034			No effect Air conditioning -To modify the internal pressure balancing system for the cold air unit
	SB 21-035			No effect Air Conditioning. Extraction System -To improve cooling airflows for inertial navigation units
	SB 21-035	01		No effect Air conditioning. Extraction system -To improve cooling airflows for inertial navigation units
	SB 21-036			No effect Air conditioning -Air generation System - to shorten the engine lower strut
	SB 21-037			No effect Air conditioning -Distribution -to reduce profile of cooling air crossover duct clip and insulation at Frame 10
R	SB 21-037	01		No effect Air conditioning -Distribution -to reduce profile of cooling air crossover duct clip and insulation at Frame 10
	SB 21-038			No effect Air Conditioning. Heat Exchanger Cooling System -To change the method of locking the

	SB/AEB NO	REV	INC. IN REVISION	DESCRIPTION
				fire valve actuator adjustment screw
	SB 21-038	01		No effect Air Conditioning. Heat Exchanger Cooling System -To change the method of locking the fire valve actuator adjustment screw
	SB 21-038	02		No effect Air Conditioning. Heat Exchanger Cooling System -To change the method of locking the fire valve actuator adjustment screw
	SB 21-038	03		No effect Air Conditioning. Heat Exchanger Cooling System -To change the method of locking the fire valve actuator adjustment screw
	SB 21-039		Aug 30/77	Embodied Air conditioning. Distribution -To trip electrical ground power in the absence of forward or aft rack cooling
	SB 21-039	01		Not applicable
	SB 21-039	02		Applicable Air conditioning. Distribution -To trip electrical ground power in the absence of forward or aft rack cooling
	SB 21-039	02	May 30/80	Embodied
	SB 21-040			Embodied Air conditioning -To increase recess bottom diameter for smoke detector O-ring seal
	SB 21-041		May 30/80	Embodied Air conditioning -To make aft vacuum pumps identical with forward vacuum pumps on cabin pressure control system
R	SB 21-041	01	May 30/81	Embodied Air conditioning -To make aft vacuum pumps identical with forward vacuum pumps on cabin pressure control system
	SB 21-042			No effect Air conditioning -Pressure and flow limiting -to improve support strut attach-ments to engine
R	SB 21-042	01		No effect Air conditioning -Pressure and flow limiting -to improve support strut attach=ments to engine
	SB 21-043			No effect

SB/AEB NO	REV	INC. IN REVISION	DESCRIPTION
			Air conditioning -Supply filters -Revised scheduled maintenance requirement
SB 21-044			Embodied
			Air conditioning -Deletion of landing gear bay ventilation check valves
SB 21-045			Not applicable
SB 21-045	01		Not applicable
SB 21-046			No effect
			Air conditioning -To facilitate removal of the test connection plug -Air conditioning generation group 4
SB 21-048			No effect
			Air conditioning -Improve reliability of air conditioning system fuel control valve microswitches
SB 21-048	01		No effect
			Air conditioning -Improve reliability of air conditioning system fuel control valve microswitches
SB 21-049			No effect
			Air conditioning -Cold air units -Replace diaphragms to improve resistance to temperature and pressure
SB 21-050			Not applicable
SB 21-051			Not applicable
SB 21-052			No effect
			Air conditioning -Increased torque tightening of screws securing the forward mounting spigot to the primary heat exchanger
SB 21-052	01		Applicable
			Air conditioning -Increased torque tightening of screws securing the forward mounting spigot to the primary heat exchanger
SB 21-053			Not applicable
SB 21-054			No effect
			Air conditioning -Ram air regulator valve of primary heat exchanger -Replace diaphragm to improve reliability
R SB 21-054	01		No effect
			Air conditioning -Ram air regulator valve of primary heat exchanger -Replace diaphragm to improve reliability
SB 21-055			No effect
			Air conditioning -Replace sintered metal

SB/AEB NO	REV	INC. IN REVISION	DESCRIPTION
			filters by wire gauge filters on regulating and safety air conditioning and cross bleed valves
SB 21-055	01		No effect Air conditioning -Replace sintered metal filters by wire gauge filters on regulating and safety air conditioning and cross bleed valves
SB 21-056			No effect Air Conditioning. Group 2 and 3 Air Conditioning Duct Temperature Regulating Sensors-Change location of labels
SB 21-057			No effect Air Conditioning. Air Extraction System - To introduce a new standard of Forward Rack Supply Filter.
SB 21-057	01		Applicable Air Conditioning. Air Extraction System - To introduce a new standard of Forward Rack Supply Filter.
SB 21-058			No effect Air conditioning. Ducting - To introduce a positive clip locating feature to the duct connecting the air conditioning valve and the mass flow valve
SB 21-059			No effect Air Conditioning - Improve Primary Heat Exchanger Ram Air Control Valve
R SB 21-059	01		No effect Air Conditioning - Improve Primary Heat Exchanger Ram Air Control Valve
SB 21-060			No effect Air conditioning. Ventilation pipes - Compartment above nacelles stringer 69 to 66 Rib 13 - Improve Removal/Installation
SB 21-060	01		No effect Air conditioning. Ventilation pipes - Compartment above nacelles stringer 69 to 66 Rib 13 - Improve Removal/Installation
SB 21-061			Embodied Air conditioning. Distribution - Stalling of Fwd extract fans
R SB 21-062			No effect Air Conditioning. Heat Exchanger Cooling

SERVICE BULLETIN LIST

SB/AEB NO	REV	INC. IN REVISION	DESCRIPTION
			System - To introduce an improved Fire Valve with increased freedom of movement on the valve gate and a redesigned actuator.
SB 21-063		Aug 30/77	Embodied Air Conditioning. Pressure Control System - Modify Regulating and Safety Valves
SB 21-063	01		No effect Air Conditioning. Pressure Control System - Modify Regulating and Safety Valves
SB 21-063	02	Aug 30/81	Embodied Air Conditioning. Pressure Control System - Modify Regulating and Safety Valves
SB 21-064			Not applicable
SB 21A047			No effect Air conditioning - Fire valve - Revised scheduled maintenance requirements
SB 21A047	01		No effect Air conditioning - Fire valve - Revised scheduled maintenance requirements
SB 21A047	02		No effect Air conditioning - Fire valve - Revised scheduled maintenance requirements
SB 34-022		Feb 28/79	Embodied Navigation. Altimeter - Install a pneumatic standby altimeter visible by both pilots.
SB 53-007		Nov 30/76	Embodied Fuselage. Skin - To make the tank 9 forward wall drainage effective on the ground
SB 53-009		May 30/77	Embodied Fuselage. Fluid drainage (Forward Fuselage) - To ensure correct operation of tank No.9 wall drainage syphon system
SB 53-040		May 30/79	Embodied R Fuselage.Wing - Inspection of insulation blankets for contamination and roofs of fuselage fuel tanks for leaks - FR 38 to 66

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SERVICE BULLETIN LIST

	SB/AEB NO	REV	INC. IN REVISION	DESCRIPTION
R	SB 53-040	01		No effect Fuselage/Wing - Inspection of insulation blankets for contamination and roofs of fuselage fuel tanks for leaks - FR 38 to 66
R	SB 53-040	02	Nov 30/79	Embodied Fuselage/Wing - Inspection of insulation blankets for contamination and roofs of fuselage fuel tanks for leaks - FR 38 to 66
R	SB 53-040	03		No effect Fuselage/Wing - Inspection of insulation blankets for contamination and roofs of fuselage fuel tanks for leaks - FR 38 to 66
R	SB 53-053		Mar 31/98	Embodied Fuselage - General - Improvements to rear fuselage equipment bay sealing, ventilation and drainage

CHAPTER 21

AIR CONDITIONING

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1. General

The air conditioning system consists of four air conditioning
groups supplying conditioned air to the cabin and flight com-
R partment in order to provide an environment compatible with the
comfort of passengers and crew.

This same air is used to ventilate the electronics equipment. It is then discharged overboard through cabin pressure regulating and safety valves.

R The four air conditioning groups are identical and are instal-
R led in pairs on each side of the aircraft.

Compressed air is normally bled by each group from the last
R stage of high pressure compressor of the associated engine. A
R cross bleed system between each pair of groups located on
one side of the aircraft makes it possible to have either group
supplied with air from the engine associated with the other
R groups or from an air supply unit if the engines are shut down.

Group No.1 supplies flight compartment in priority
Group No.2 supplies the forward cabin
R Groups No.3 and No.4 supply the aft cabin

2. Air Conditioning Group Description (Ref. Fig.001 and 002)

A. General

Each air conditioning group consists of the following components :

- An air bleed and cross bleed system
- A primary cooling system
- A secondary cooling system
- An air heat exchanger cooling system
- A fuel heat exchanger cooling system
- A Cold Air Unit outlet ice sensor transducer and water separator.
- A distribution system

B. Air Bleed and Cross Bleed System

(1) Dual pressure reducing shut off valve

R This equipment consists of two valves, the operation of which is independent ; they are housed in the same body.

- Shut off valve (upstream section)

R It is an electro pneumatic valve, electrically operated (opened or closed) by means of a switch ; it can also be closed by one of the system safety devices.

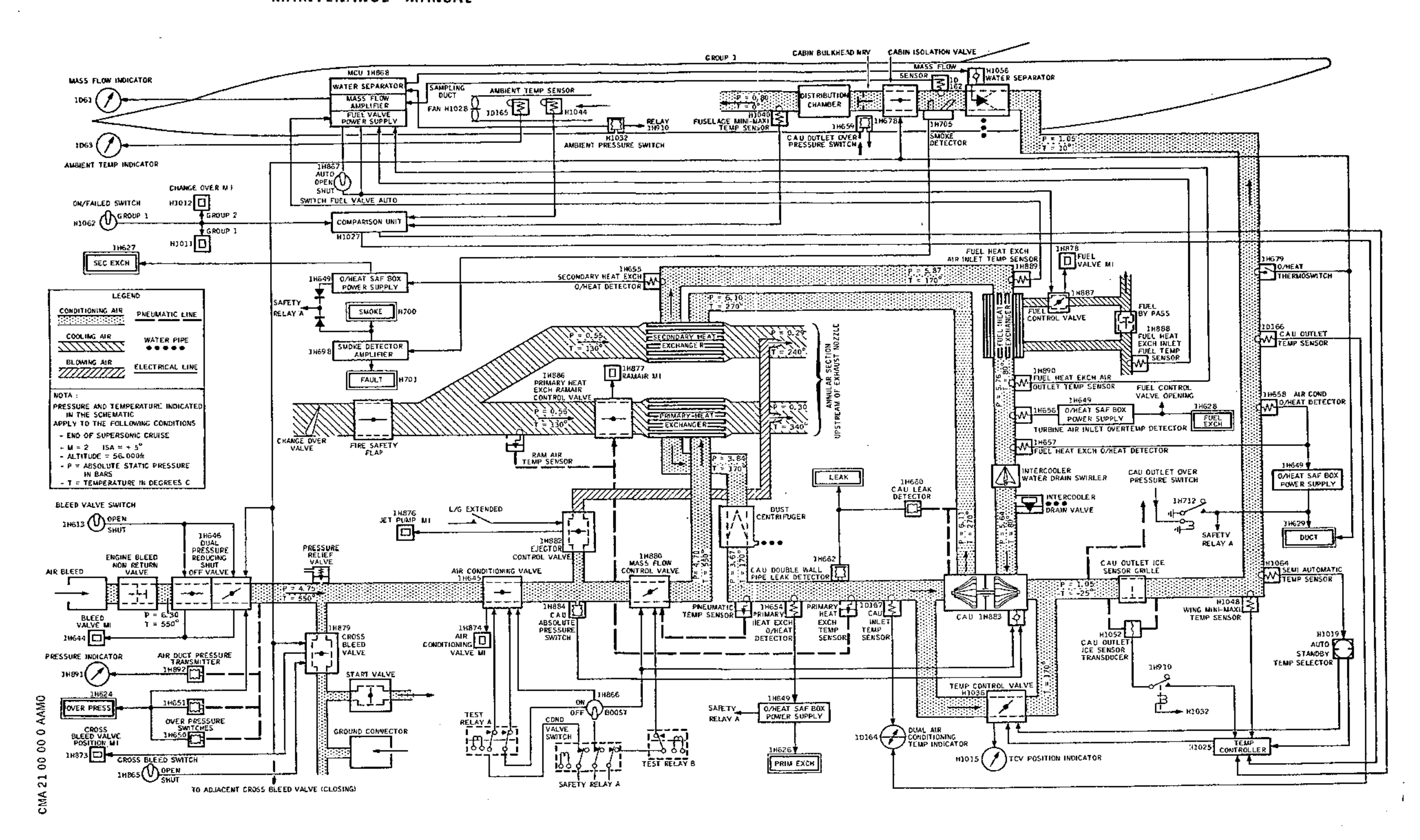
- Pressure reducing valve (downstream section)

It is an electro pneumatic valve ; it reduces the group outlet air pressure to a value compatible with the group performances (65 psi). Its operation (normal closing and safety closing) is identical to that described for the upstream section.

(2) Cross bleed valve

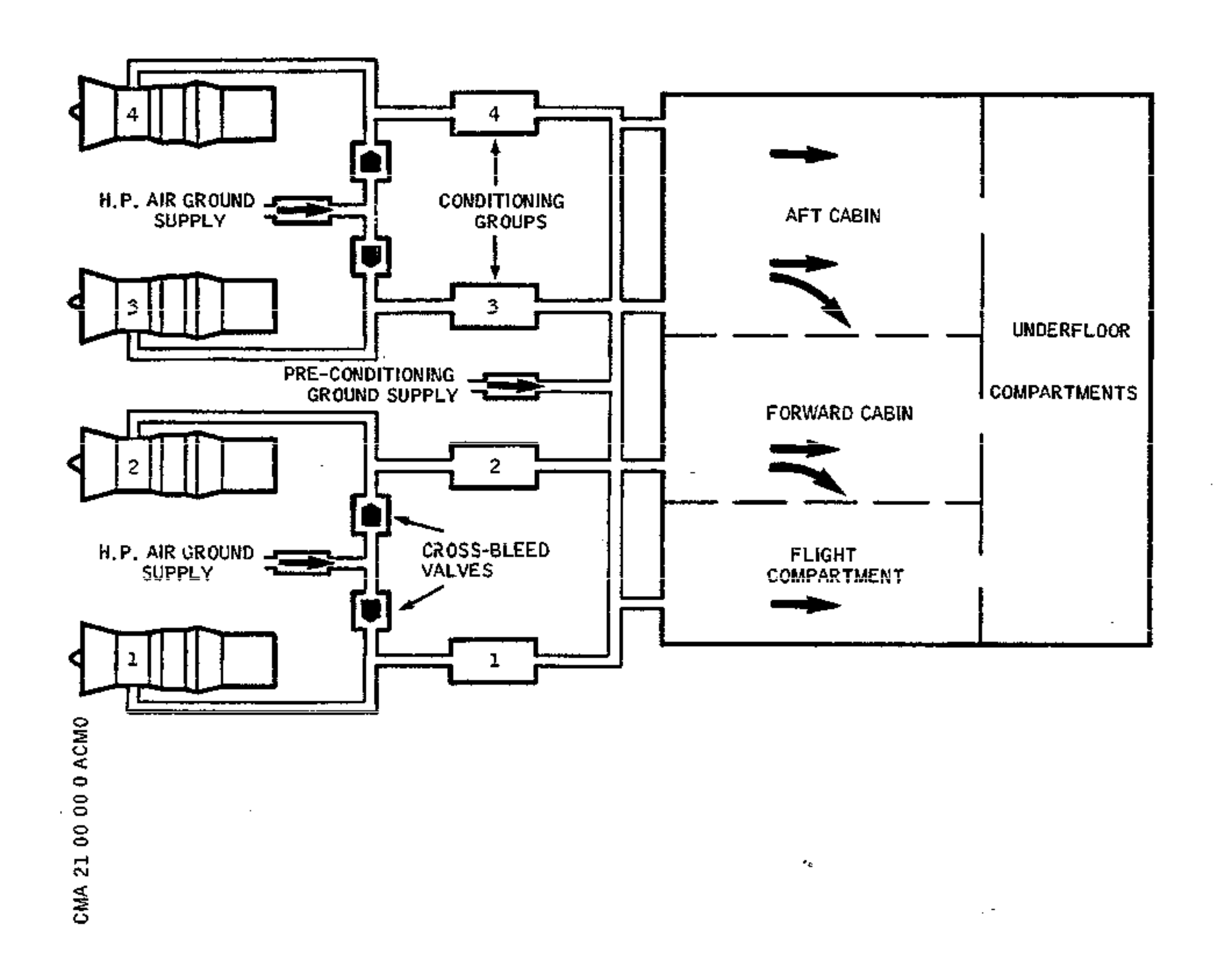
Two electro pneumatic cross bleed valves are installed between the two adjacent air conditioning groups.

They allow :
- Either group to be supplied by the air source from the adjacent group.
- Two adjacent groups to be simultaneously supplied by a ground air supply unit (high pressure supply).
- One engine to be started up by the adjacent one if necessary.



Description of a Group
Figure 001

R



R

Generation - General
Figure 002

The cross bleed system makes it possible to isolate one group from the others or to have one group supplied by the adjacent one.

R The cross bleed valve is operated (opened or closed) by means of a two position switch.

C. Primary Cooling System

The system consists mainly of :

(1) An air conditioning valve

It is located downstream of each pressure reducing and shut off valve.

R - This electro magnetic valve cuts off or admits air-
R flow at determined rates, resulting from the gradual
R variation of outlet cross-section throughout the
R opening and closing operating time, which is :

Opening : 30 seconds
Closing in flight and on the ground : 20 seconds

- In addition, the safety function enables the valve to close in less than 2 seconds.

- It is possible to test this valve by means of the COND VALVE switch 1H866 located on Flight Engineer's panel.

(2) Mass flow control valve

It is an electro pneumatic valve. It limits the airflow to 45 lb./min. in normal operation.

This airflow can be increased to 53 lb./min. when the air conditioning valve switch is in BOOST position.

The airflow is automatically decreased to 19 lb./min. when an excessive air temperature is detected downstream of this valve (205°C).

It is possible to test this valve by means of a rotary test switch located on Flight Engineer's panel.

(3) Primary heat exchanger

The function of the heat exchanger is to limit the Cold Air Unit compressor inlet temperature to 200°C approximately in normal operation.

It is a compact plate and fin type exchanger. It permits a cross flow of two runs of charge air interlacing a single run of cooling air.

(4) Ram air control valve

This valve operates to control the airflow through the primary heat exchanger in order to keep the system performances at cold temperature. The valve is pneumatically operated. It is operated by the cooling air duct thermostat when the latter detects a temperature of 25°C and by the primary heat exchanger thermostat when the latter detects a temperature of 100°C. This double operation makes it possible to have a correct temperature of the primary heat exchanger downstream airflow.

D. Secondary Cooling System

(1) Cold air unit (bootstrap)

The cold air unit consists of a centrifugal compressor and an expansion turbine mounted on the same shaft. Lubrication of the ball bearings is achieved by a continuous flow of lubricating oil. The cold air unit is provided with a three position turbine nozzle corresponding to three different outlet areas.

The blades of the outlet nozzle are operated by a pneumatic actuator automatically controlled by Cold Air Unit absolute pressure switch (threshold : 40 psi), landing gear relays and air conditioning valve switch when it is in BOOST position.

The cold air unit housing is sufficiently resistant to retain loose parts if the rotating assembly breaks.

Cold air unit operation.

Temperature and pressure of conditioning air are increased in the compressor. The air is cooled in the secondary heat exchanger and fuel heat exchanger ; its expansion rate is high in the turbine.

Air expansion in the turbine provides the energy to drive the compressor, at the same time lowering the
R temperature by 100°C.

(2) Secondary heat exchanger

The function of this heat exchanger is to lower the

fuel heat exchanger inlet air temperature to 190°C approximately in normal operation.

It has the same physical characteristics as the primary heat exchanger ; it is also installed on the cooling air system.

(3) Fuel heat exchanger

R This exchanger is designed to reduce the conditioning
R air temperature at the turbine inlet to the lowest va-
R lue compatible with its volume and permissible inflow.

R Made of stainless steel, it is of the compact plate
R and fin type. It permits a cross flow of six runs of fuel and one run of conditioning air.

(4) Intercooler water drain swirler

It is associated with the intercooler drain valve ; its
R function is to remove condensation water from the
R conditioning air in order to prevent turbine erosion.

(5) Cold air unit by pass system

The temperature control valve is the main component of this system.

This valve controls the air temperature at the cold air unit outlet in accordance with the value selected on corresponding temperature control selector. It is an electro pneumatic valve controlled by two different electrical circuits (independent torque motors) :

- the automatic control circuit via the automatic temperature controller ;
- the standby control circuit via the temperature controller integral with the temperature control selector.

R If either circuit fails, the other is not affected.

E. Cooling Systems

(1) Air heat exchanger cooling air system

The cooling air is bled at two points :

- At high speeds, the air is bled at the engine air inlet.
- At low speeds (lower than 0.6 M), the air is bled on

the nacelle side.

These two bleed points are interchangeable due to an automatically operated flap. The airflow can be increased if air ejectors operate. They are used when the air bled on engine inlet or nacelle is not sufficient for cooling. The ejectors are supplied by air bled downstream of the air conditioning valve through
R an ejector control valve. This electro pneumatic val-
R ve is controlled by a solenoid ; it opens when the
R solenoid is electrically supplied and closes when the solenoid power supply is cut out.

The solenoid is electrically supplied when the main landing gear is downlocked.

The valve has no manual control.

(2) Cooling fuel system of fuel heat exchanger

The fuel control valve is the main component of this system. This electric valve has two operating modes, manual or automatic, according to the FUEL VALVE switch position.

R In automatic mode, associated with its sensing ele-
R ments (three sensors and a controller) it enables :

R - Cooling of fuel supply to fuel heat exchanger when the air temperature at the heat exchanger outlet is greater than 15°C and when temperature at the heat exchanger inlet is greater than the fuel temperature. If one of these conditions is not fulfilled the fuel control valve closes.

F. Cold Air Unit Outlet Ice Sensor Transducer and Water Separator

(1) Cold Air Unit outlet ice sensor transducer

R The ice sensor transducer is located downstream of the cold air unit.

It transmits an electrical signal to the temperature controller according to the minimum temperature downstream of secondary cooling system, in order to prevent icing downstream of this system.

(2) Water separator

When the aircraft altitude is lower than 30,000 feet

approximately, the water separator removes 80% of the
water in suspension in the conditioning air and expels
R it overboard.

R Above 30,000 feet where the layers of atmospheric air
are dry, the water separator is by-passed by means of
a valve controlled by an electric actuator in order to
R reduce the drop in air pressure.

If the by-pass system is open by means of the water
separator internal by-pass electric actuator, the drain
R orifice is closed, which prevents conditioning air
R flowing overboard at high altitude.

G. Distribution System

The distribution chamber is located at the distribution system inlet ; it collects the air supplied by the groups in order to provide air conditioning of all compartments if one group fails.

R The non return valves prevent the air returning to the
air conditioning groups.

In normal operating conditions the distribution of airflows enables air supply of the various compartments.

Downstream of the water separator, a cabin isolation valve
closes automatically in the event of duct overheat in order
R to prevent hot air flowing to the cabin if the engine
breaks.

This electric valve is associated with a warning light. It is possible to check its operation when it closes.

H. Warning and Safety Systems

Each air conditioning system has a safety system to prevent :

Overheat, overpressure, leaks and dust ingestion.

(1) High temperature safety

The overheat thermoswitches cause the air conditioning valve and mass flow control valve to close.

In the event of fuel heat exchanger overtemperature (95°C), the fuel control valve opens. The distribution duct overheat (210°C) causes the shut off valve, cabin isolation valve and two adjacent crossbleed valves to

close. In this case the group is no longer operative.

The pneumatic temperature sensor associated with the mass flow control valve controls the temperature downstream of the primary cooling system by limiting the airflow (19 lb./min.) if the temperature detected downstream of the cooling system reaches 205°C.

(2) Overheat test and air conditioning valves

A rotary test switch located on Flight Engineer's panel enables checking of overheat detection devices.

Cabin isolation valve closing is tested by pressing DUCT warning light.

(3) Overpessure safety

When overpressure switch operates (85 psig) the shut off valve closes. Operation of downstream turbine overpressure switch causes the air conditioning valve and mass flow control to close. On water separator, an internal flap opens automatically when the upstream and downstream differential pressure reaches 4 psi.

(4) Leak detection of cold air unit double wall

The compressor housing and upstream and downstream ducts are provided with double walls in order to prevent hot air leaks in wing compartment. When Cold Air Unit leak detector or Cold Air Unit double wall pipe leak detector operates, the LEAK warning light comes on.

(5) Dust

A dust centrifuger provided with a dust outlet is mounted on the system.

(6) Fuel

R The fuel heat exchangers and the partitions separating
R the fuel from the ambient and conditioning air are of
R double wall construction.

R The wall interspace is connected to a drain system enabling detection of air or fuel leaks during maintenance checking on the ground.

(7) Smoke detection (Ref. Fig. 003)

R Four high sensibility smoke detectors installed
R downstream of the water separators monitor the air blown from the air conditioning groups,the airflow speed being very high.

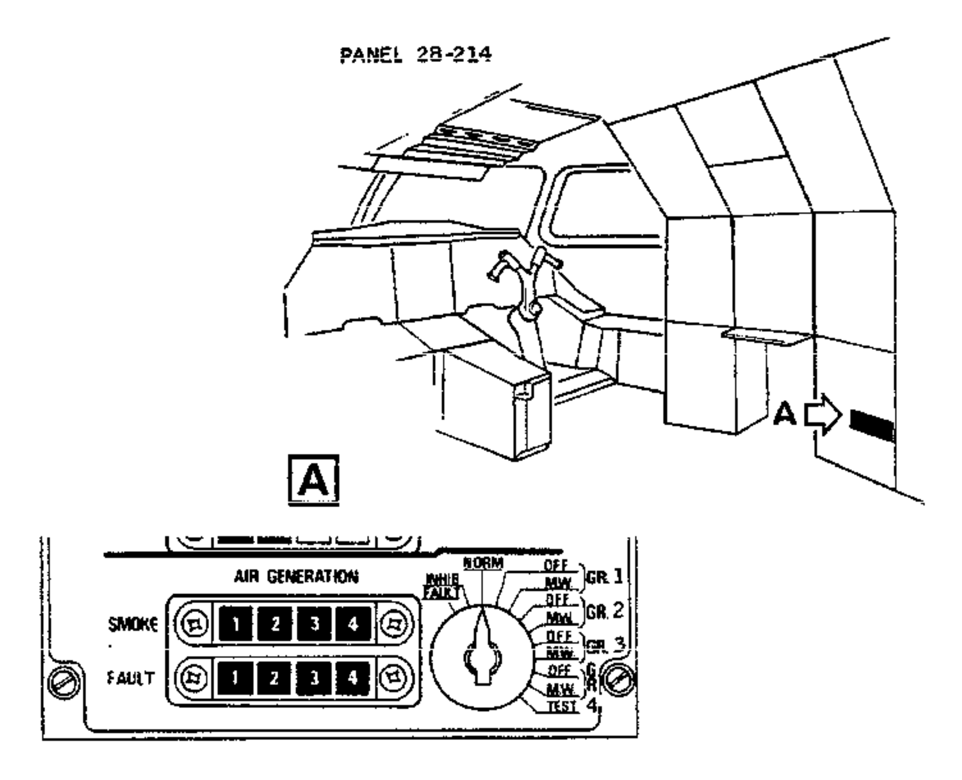
On Flight Engineer's panel, an AIR GENERATION rotary switch enables test of associated detectors and systems :

- Four SMOKE amber warning lights from 1 to 4 enable location of smoke detection ;
- Four FAULT yellow caption lights from 1 to 4 which indicate failure of smoke detection systems.

J. Air Conditioning Monitoring and Control Components (Ref. Fig. 004)

The AIR BLEED CONTROL panel is located on Flight Engineer's panel. It consists of the following components :

- A schematic representation of the four air conditioning groups and cross bleed systems.
- Warning lights.
- Temperature control valve position indicators.
- Control switches.
- Bleed air pressure gauges and indicators.
- Magnetic indicators.



SMOKE (1,2,3 OR 4) WARNING LIGHT COMES ON IF SMOKE IS DETECTED IN THE DUCTING OF ASSOCIATED GROUP.
THE GONG SOUNDS, SMOKE WARNING LIGHT IS ILLUMINATED ON MASTER WARNING PANEL AND THE AIR CONDITIONING GROUP IS SHUT-DOWN

IN CASE OF FALSE WARNING, AIR CONDITIONING GROUP CAN BE REOPENED BY PLACING SELECTOR SWITCH IN INHIB POSITION

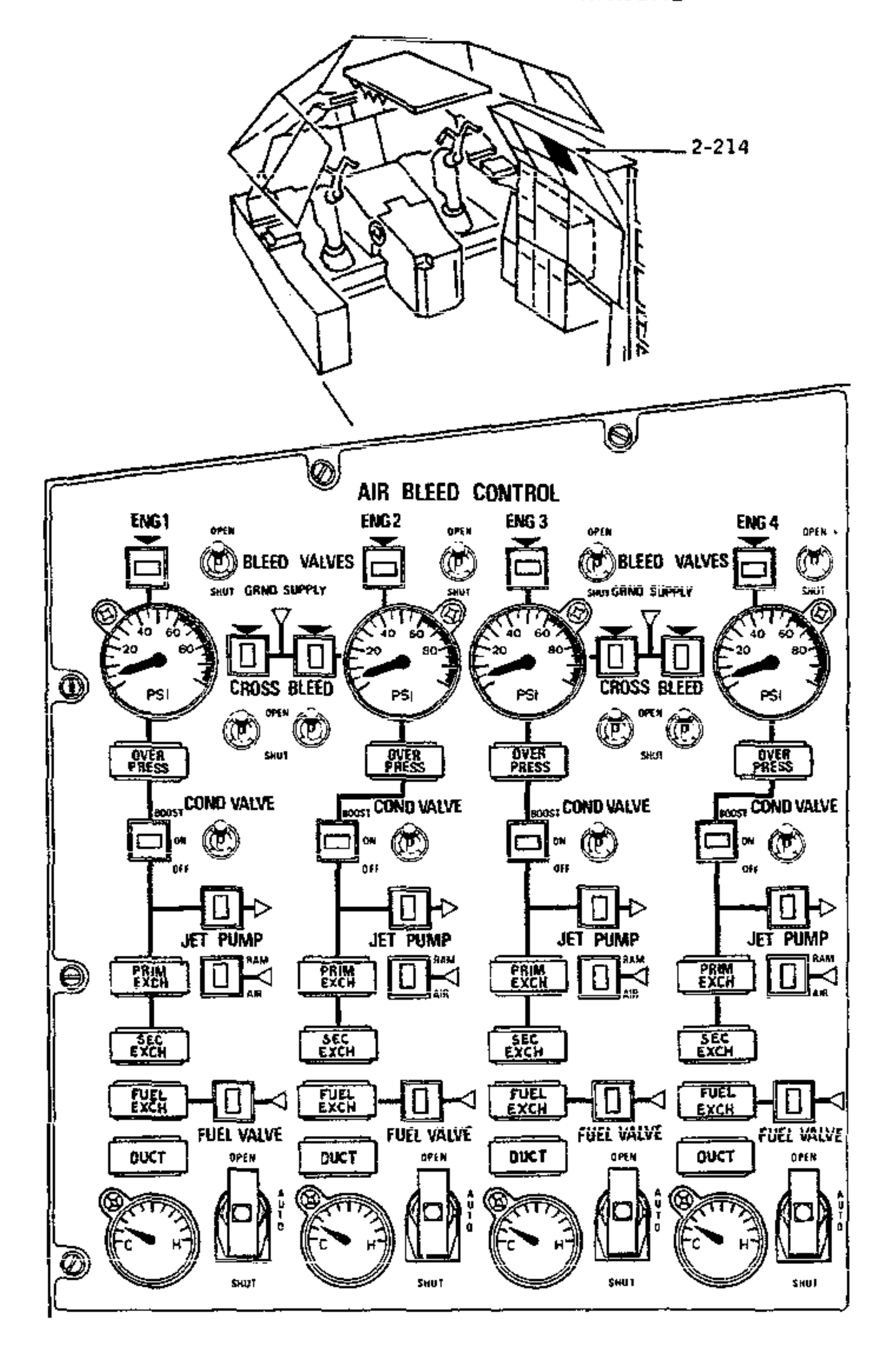
FAULT (1,2,3 OR 4) INDICATOR LIGHT COMES ON IF THE ASSOCIATED SYSTEM IS FAULTY. IN THIS CASE, SMOKE DETECTION OF ASSOCIATED GROUP IS INOPERATIVE.

A ROTARY SELECTOR SWITCH ENABLES COMPLETE CHECK OF THESE SYSTEMS.

CMA 21 00 00 0 ADM0

Smoke Detection Panel 28-214
Figure 003

R



CMA 21 00 00 0 ADUO

R

AIR BLEED CONTROL Panel
Figure 004

3. Automatic Temperature Control System (Ref. Fig. 005)

A. General

The temperature control system provides the following functions :

- An adjustment of conditioning air temperature in each compartment.
- Limitation of distribution duct maximum and minimum temperatures in each compartment ;
- R Limitation of duct maximum and minimum temperatures downstream of each cold air unit ;
- De-icing of system downstream of each expansion turbine.

B. Description

Four identical temperature control systems enable adjustment of temperature of conditioning air supplied by the corresponding groups :

- Group 1 supplies air to flight compartment.
- Group 2 supplies air to forward cabin.
- Groups 3 and 4 supply air to aft cabin and route excess air to forward cabin system.

R In the event of failure of compartment air supply and temperature control, switching of temperature control systems makes it possible to maintain a temperature compatible with passenger comfort.

There are two ways of monitoring temperature control :

- Automatic
- Standby

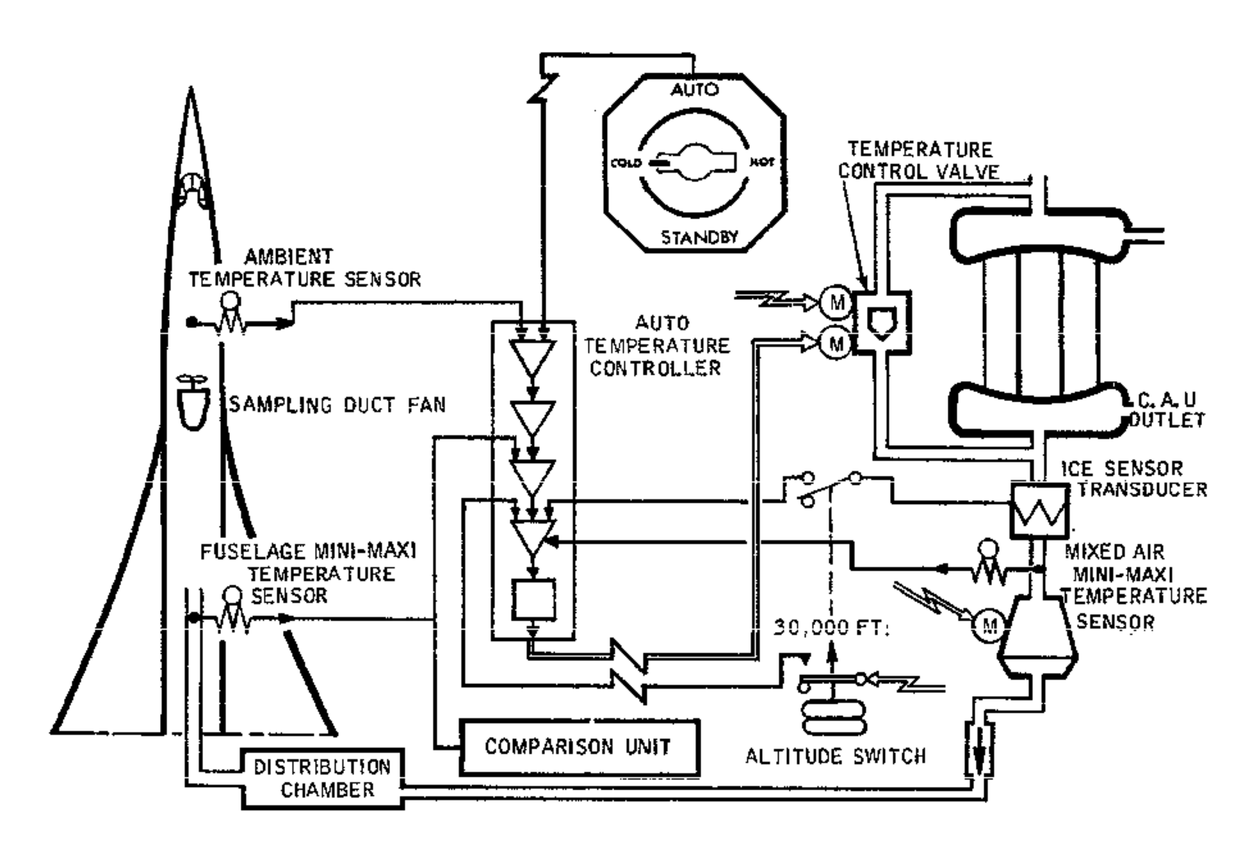
R In AUTO, any difference between the required temperature (selected on AUTO temperature selector) and compartment ambient temperature (detected by compartment ambient temperature sensor) produces an error signal.

This signal is modified through the automatic temperature controller by adding various signals from various sensors (mixing and distribution temperature) ; the resulting signal is amplified and supplies power to the torque motor which controls the temperature control valve position.

C. System Components

R (1) Temperature selector

TEMPERATURE CONTROL AUTO SYSTEM



CMA 21 00 00 0 AEMO

Automatic Temperature Control
Figure 005

R

In automatic mode, it supplies an electrical signal to the temperature controller according to the temperature selected. Whatever the temperature selected, the average compartment temperature is limited to :

Mininum + 15°C
Maximum + 30°C

(2) Temperature controller

R The temperature controller is an electronic unit entirely equippped with transistors.

R In automatic mode, it supplies a control signal to the
R temperature control valve, according to :

R - Temperature selected on temperature selector.
- Signals from the various sensing elements.
- Specific adjustments of the temperature controller itself limiting the distribution duct air temperature to ± 10°C minimum.

The temperature controller does not operate in STANDBY mode.

(3) Sensing elements associated with temperature controller

- Ambient temperature sensor, ventilated by a sampling duct fan so that it detects an air temperature close to the compartment air average temperature.
- Fuselage mini-maxi temperature sensor : detects the distribution duct air temperature.
- Wing mini-maxi temperature sensor : limits the temperature downstream of cold air unit.
- An ambient pressure switch : it detects the outside static pressure and closes a contact depending on
R whether the aircraft altitude is above or below 30,000 feet. It is also associated with the system which modifies the water separator by-pass valve position and the signal from ice sensor transducer.

  In the event of faulty operation of automatic temperature control system the standby mode is used for temperature control.

(4) Connections between temperature control systems

Groups 1 and 2 temperature control systems are independent.
Groups 3 and 4 temperature control systems can have an independent operation ; they are normally connected in order to provide equal group outlet temperatures.

In the event of failure, the switching systems enable :

- Isolation of failed group.
- Disconnection of temperature control systems of groups 3 and 4.
- Transfer of temperature control of a compartment associated with a failed temperature control system to the next temperature control system.

D. Standby Temperature Control System (Ref. Fig. 006)

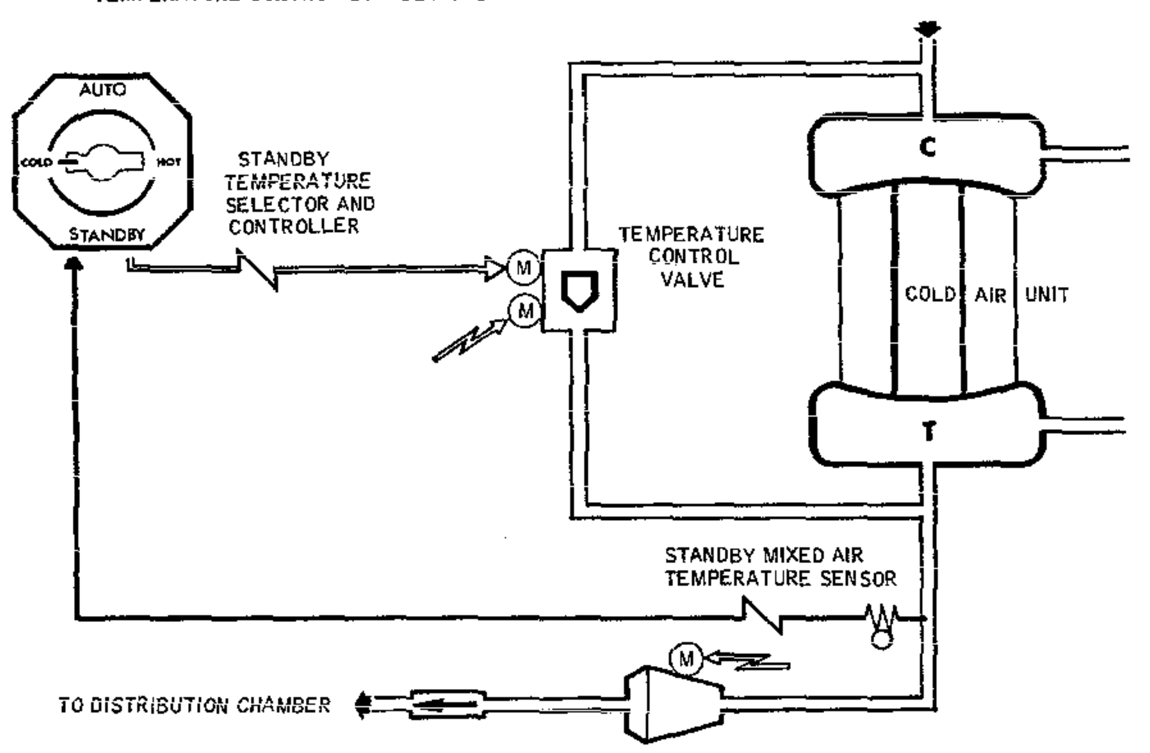
R An error signal is generated if there is a difference between the selected temperature (selected on STANDBY portion of temperature selector) and duct temperature downstream of the mixing point (detected by temperature sensor at the mixing point).

This signal is amplified by standby temperature controller built in temperature control selector and is supplied to the second torque motor which controls the temperature control valve position.

An automatic control system failure is not affected by a manual control failure and vice versa.

E. Temperature monitoring and control of the four systems TEMPERATURE CONTROL panel is located on Flight Engineer's panel ; it enables :

- Temperature control of each group.
- Visible check of temperatures and flow.
- Switching of groups in the event of failure of one of them.



CMA 21 00 00 0 AFMO

R

Stand-By Temperature Control
Figure 006

4. Pressurization System
R (Ref. Fig. 007)

A. The purpose of pressurization is to maintain a pressure compatible with passenger comfort inside the cabin.

B. The cabin pressure control system consists of :

- Two systems identical and independent : system 1, system 2.
- Only one system is selected by means of a two position switch : SYS 1, SYS 2.

Both systems are automatic.

Each system consists of :

- A pressure regulating selector.
- An amplifier.
- Two electro pneumatic regulating and safety valves.
- Two vacuum pumps.

C. Pressure Regulating Selector

The function of the pressure regulating selector is to produce an error signal depending on the selected cabin altitude and the true cabin altitude. This signal is amplified and controls one forward regulating and safety valve and one aft regulating and safety valve.

The required cabin altitude is selected by means of Knob A in upper window.
The aircraft altitude up to which the selected altitude can be maintained appears in the upper window.

- A knob with a B letter on it makes it possible to perform the barometric corrections.
- A knob with a R letter on it makes it possible to select the cabin pressure variation rate.

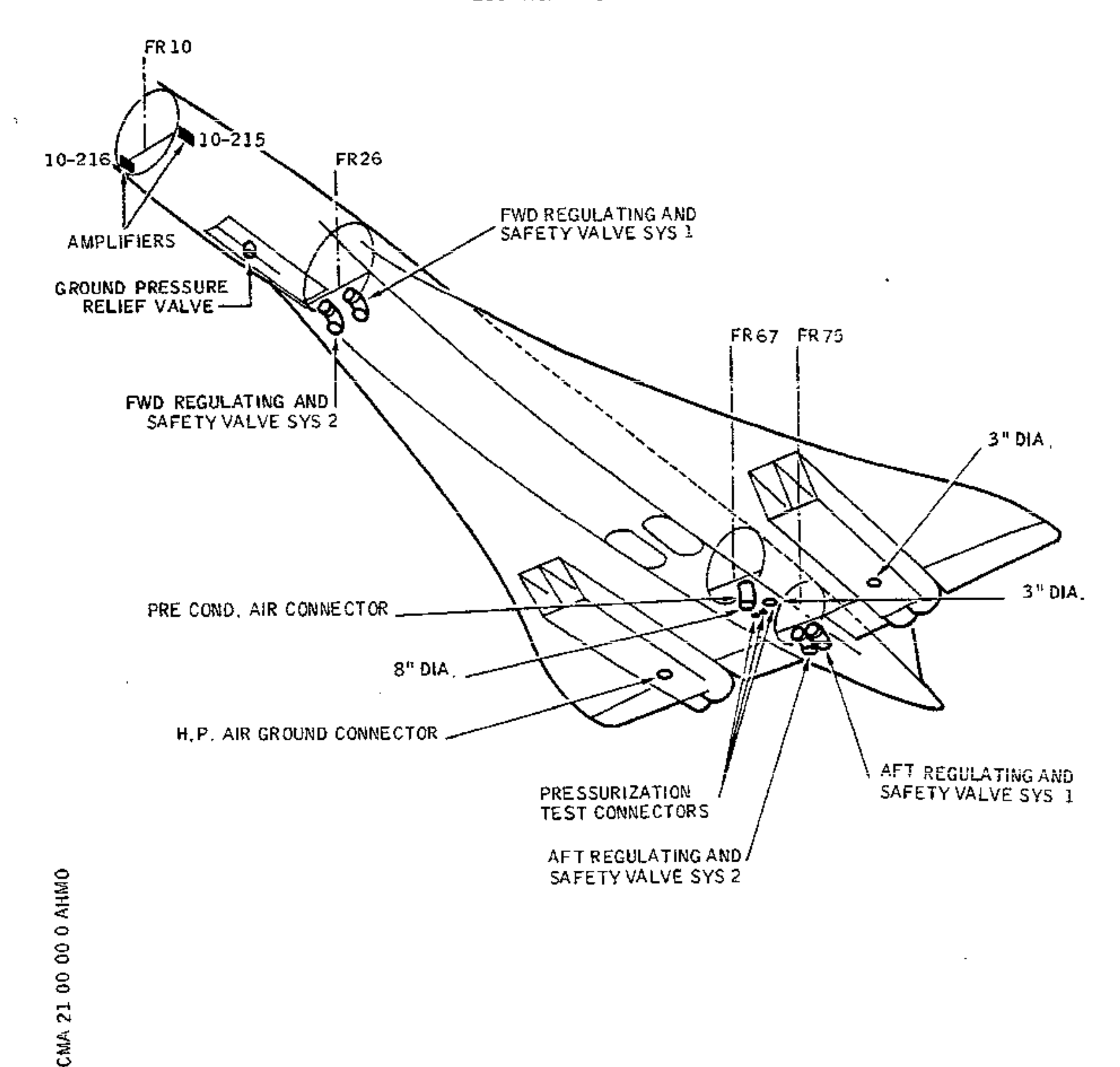
D. Warnings and Safety Systems

(1) Safety systems

The regulating and safety valve closes if cabin altitude reaches 11,000 feet.
The regulating and safety valve opens if positive cabin differential pressure reaches 11.2 psi.
The regulating and safety valve opens if negative cabin differential pressure reaches 0.5 psi.
A venturi located at the regulating and safety valve

REGULATING AND SAFETY VALVES & GROUND CONNECTIONS

LOCATION DIAGRAM



R

Pressurization System
Figure 007

outlet limits the cabin altitude to 15,000 feet.

(2) Warnings

An altitude switch operates associated safety devices if cabin altitude reaches 10,000 feet.

R One differential pressure switch is associated with each regulating and safety valve.
The pressure switches are connected to the forward valves only.
The pressure switches operate associated safety devices if cabin differential pressure reaches 11 psi.
A ditching system is controlled by a DITCHING VALVE switch.
A SYS 1, SYS 2 DISCHARGE VALVE switch with three positions FWD CLOSE, NORM, AFT CLOSE enables closure of the regulating and safety valve via a solenoid.

E. Vacuum Pump

The vacuum pump makes it possible to obtain a differential pressure inside the valve chamber so that the valve opens.

Above a predeterminated value a pressure switch cuts out power supply to the vacuum pump.

F. Cabin Pressurization Operation

On the ground with throttle control levers in idle position, the four valves are open. Both amplifiers are supplied via
R EMERGY DEPRESS NORM TEST switch in NORM position and via SYS 1, SYS 2 switches. Selectors are not used for pressurization.

When the throttle control levers are at take off setting, if system 1 or 2 is selected, throttle control lever microswitches feed a signal to the amplifier of each system in order to close the two valves they control.

In flight the selected system amplifier receives the signals selected on the corresponding pressure regulating se-
R lector and controls cabin pressure.

The non-selected system remains in standby with both valves closed.

G. Ground Pressure Relief Valve

A ground pressure relief valve located in nose gear bay
R reduces differential pressure on the ground.

At take off the throttle control lever microswitches control the valve closing.

After landing, the landing gear relays control the valve opening. The valve has two motors and can be closed by the GROUND PRESSURE RELIEF VALVE switch on CABIN PRESSURE CONTROL panel.

H. Thrust Recovery Nozzle

A thrust recovery nozzle is installed downstream of system 1 forward valve.

It recovers a thrust of 300 kg approximately during flight. As long as the differential pressure is lower than 2.9 psi the flaps are completely open. When pressure reaches 5.8 psi the flaps are completely closed.

The thrust recovery nozzle is monitored by a magnetic indicator located on CABIN PRESSURE CONTROL panel.

J. Nose gear is ventilated by air bled on forward pressure regulating and safety valve discharge orifice.

K. Main gear is ventilated by air bled from the cabin, flowing through a restrictor and two check valves.

5. Distribution

R A. General (Ref. Fig.008 and 009)

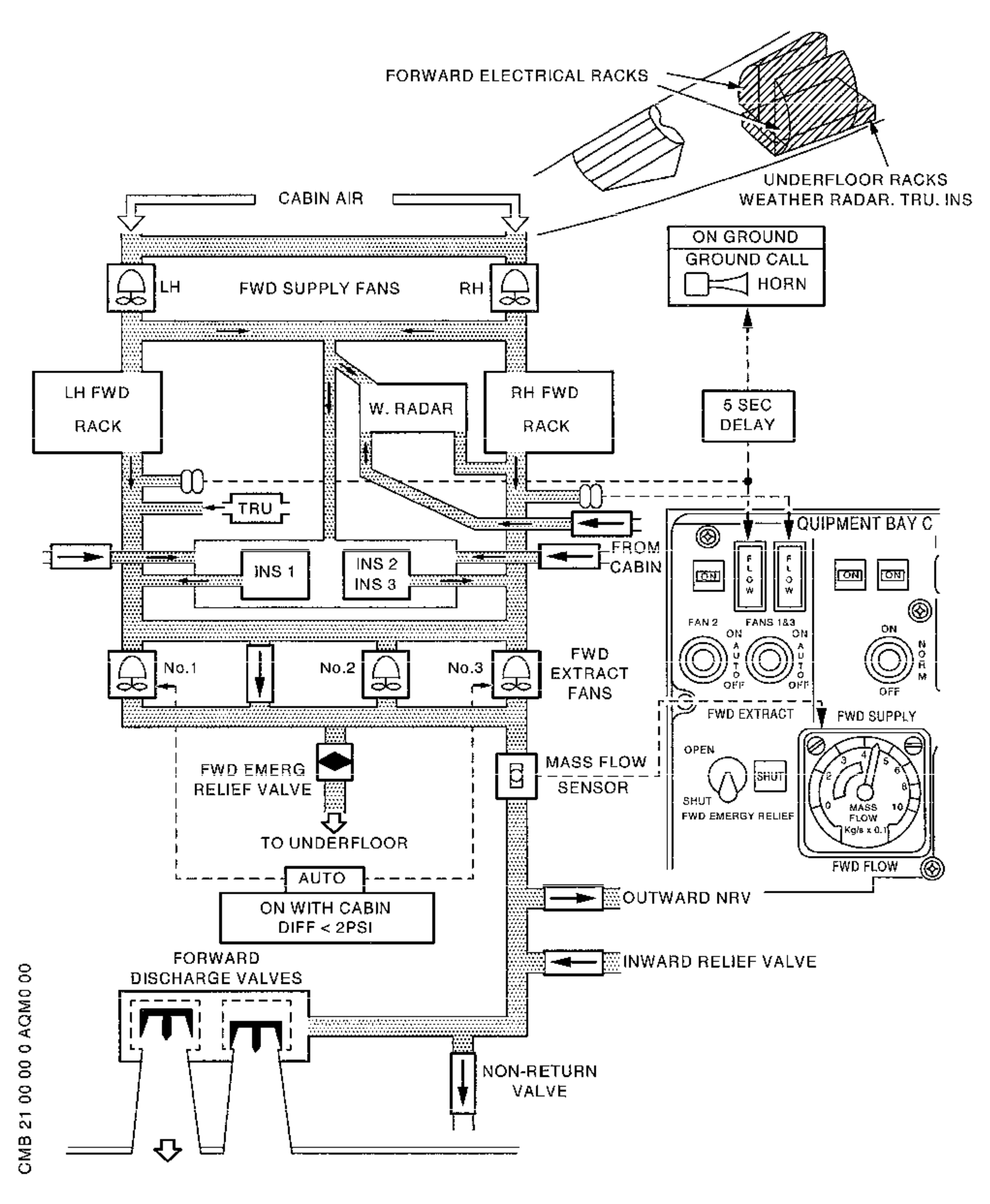
The main air extraction system supplies cooling air to equipment racks in the flight compartment, rear fuselage and beneath the floor.

The system is controlled from panel 2-214 at Flight Engineer's station and must be operating when the electrical systems are energized. The forward extraction system is energized automatically through a landing gear weight relay.

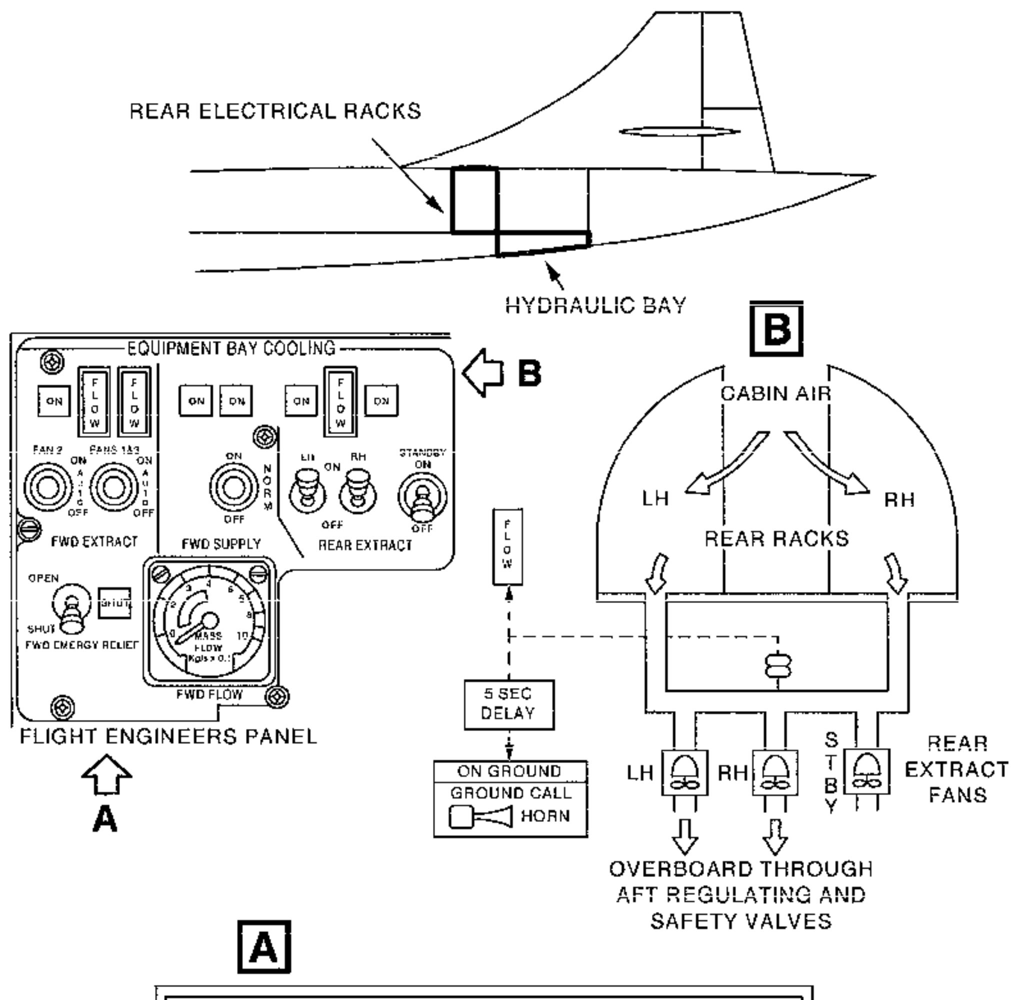
The air supply normally exceeds that extracted to ensure a small positive pressure which prevents inward leakage from the underfloor space to the racks.

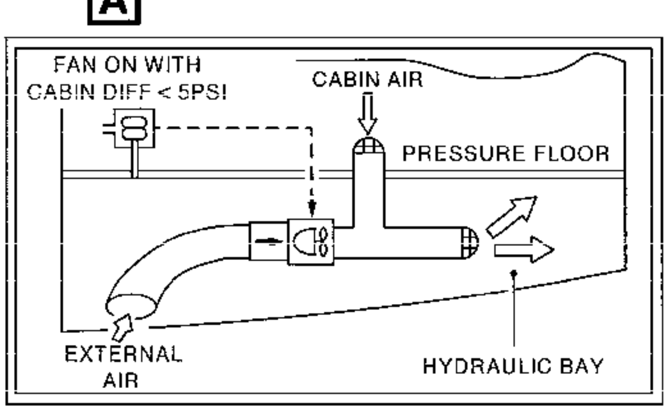
On the ground, pre-conditioned air is normally supplied from a ground air conditioning unit, but in its absence sufficient circulation can be obtained through open cabin doors.

Fresh air distribution and the ventilation of hydraulic, battery and fuel compartments are arranged as separate sub-



Forward Extraction Systems - Schematic
Figure 008





THIS EQUIPMENT IS DELETED BY SB 53-053 AND MAY BE REMOVED OR ELECTRICALLY ISOLATED AT THE OPERATORS DISCRETION.
NOTE: IF THE EQUIPMENT IS REMOVED FROM THE AIRCRAFT, THE DUCT WILL BE SUPPORTED AND BLANKED OFF.

CMB 21 00 00 0 ASM0 00

Aft Extraction System - Schematic
Figure 009

systems.

B. Forward Supply Fans

Two axial flow fans, one on each side of the underfloor bay in zone 123/4, extract air from the passenger compartment and supply it to the forward equipment racks.

C. Forward Extraction Fans

Three axial flow fans at a junction of the extraction ducting in zone 125/6, extract air from the flight compartment and forward equipment racks, and discharge it overboard through the forward regulating and safety valves.
When weight is on the landing gear and the busbars are energized, these fans run automatically.

D. Rear Extractions Fans

Three mixed flow fans below the floor in zone 153/4, extract air from the rear equipment racks and discharge it into the underfloor space.

E. Power Supplies

SERVICE	BUSBAR	CIRCUIT BREAKER PANEL
Forward Supply Fan LH	No.2 Main 200 VAC	13-215
Forward Supply Fan RH	No.4 Main 200 VAC	14-216
Forward Extraction Fan - No.1	No.1 Main 200 VAC	14-215
Forward Extraction Fan - No.3	No.3 Main 200 VAC	13-216
Forward Extraction Fan - No.2	No.4 Main 200 VAC	14-216
Rear Extraction Fan - LH	No.2 Main 200 VAC	13-215
Rear Extraction Fan - RH	No. 4 Main 200 VAC	14-216
Rear Extract Fan - Standby	No. 2 Essential 200 VAC	2-213

SERVICE	BUSBAR	CIRCUIT BREAKER PANEL
All Supply and Extraction Fans - Indication Forward and Rear Extraction Duct Pressure Switches	"B" Essential 28VDC	5-213
Emergency Relief Valve	"A" Essential 28VDC	1-213
Flow Indication System	"A" Essential 28VDC	1-213

F. Controls and Indicators (Ref. Fig. 010, 011 and 012)

Controls and indicators are grouped together on the EQUIPMENT BAY COOLING section of panel 2-214 at the Flight Engineer's station. Amber FLOW warning lights indicate air flow failure in the forward and rear extraction ducts and the master warning system gives an AIR warning. The rear extraction standby fan has no separate indicator, however the FLOW warning light indicates its operation. The air flow failure system serves as the inertial navigation system ventilation failure warning, and the ground call horn sounds if there is no air flow.

Precise air flow in the forward extraction duct is shown on a MASS FLOW indicator which reads from 0 to 1 kg/sec. A red segment indicates air flow below the acceptable minimum.

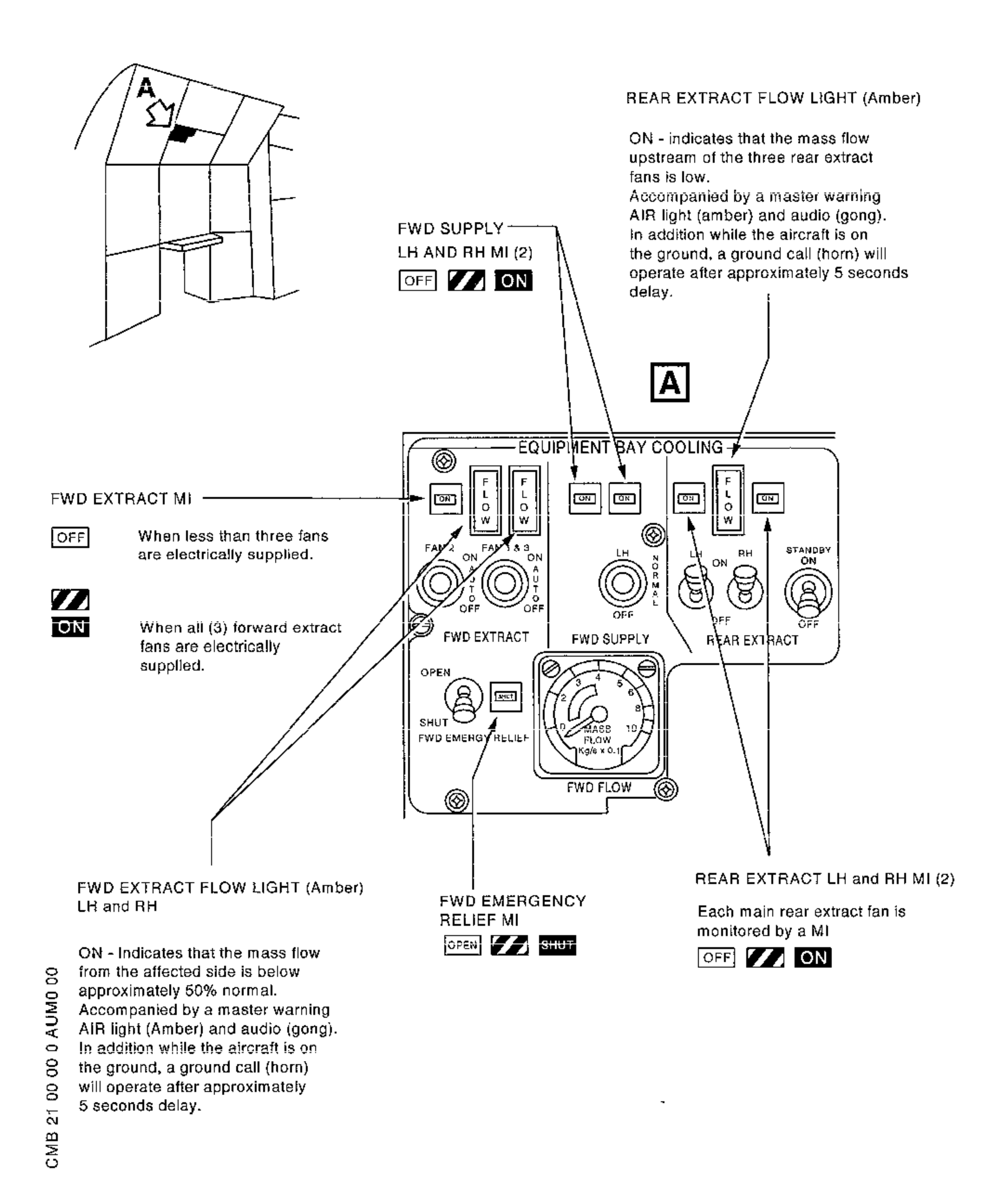
Separate indication of forward emergency relief valve operation is given by a magnetic indicator which shows OPEN or SHUT.

A magnetic indicator for the HYD BAY FAN is also on this panel.

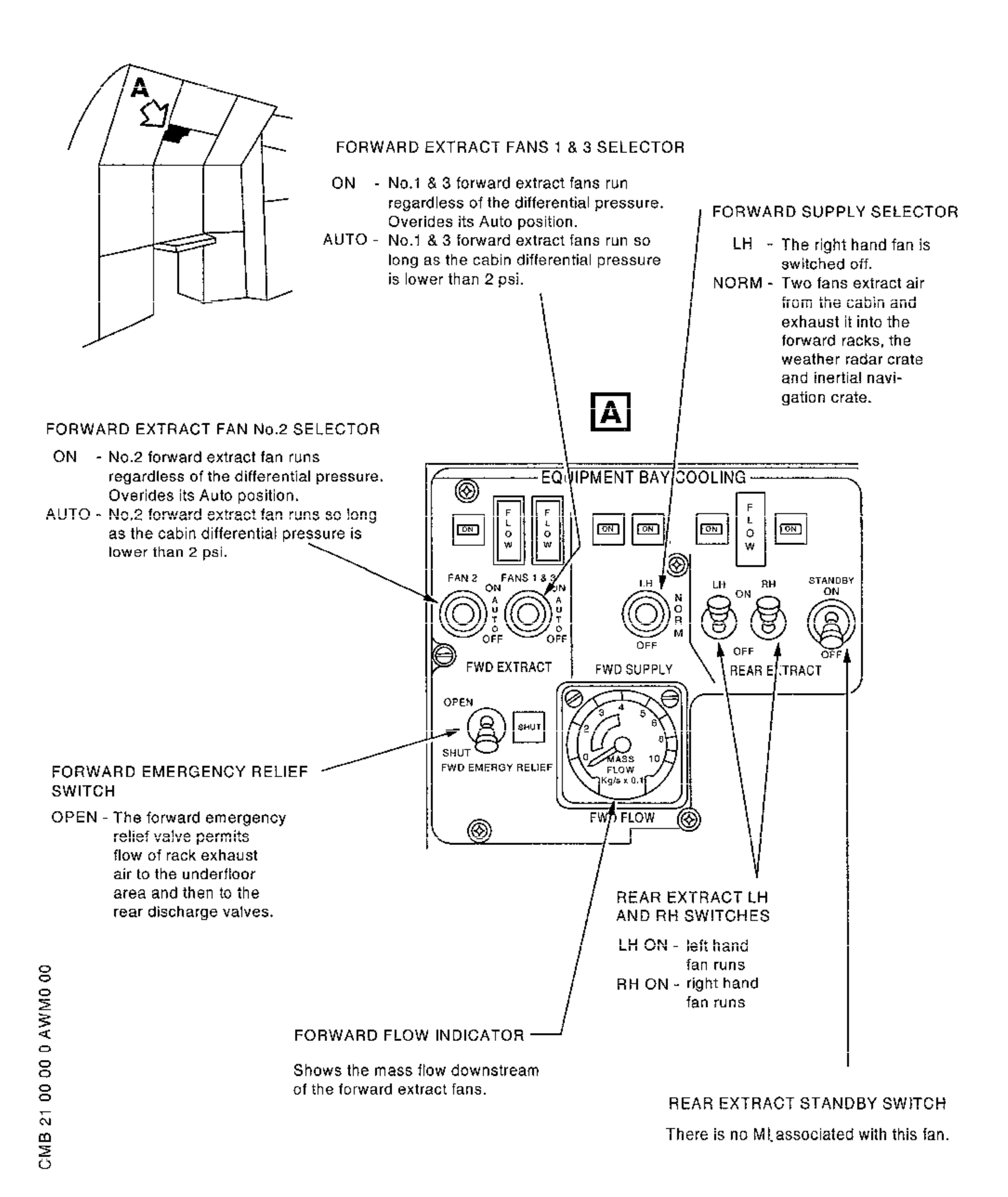
The caption lights incorporate diodes to prevent feed-back when a filament test is carried out. They also incorporate a dimming facility. Pressing the cap of the FLOW warning lights checks the serviceability of the associated AIR master warning channel.

G. Fresh Air Distribution (Ref. Fig. 013, 014 and 015) (Ref. Fig.016 and 017)

Air from the ground conditioned air supply is directed

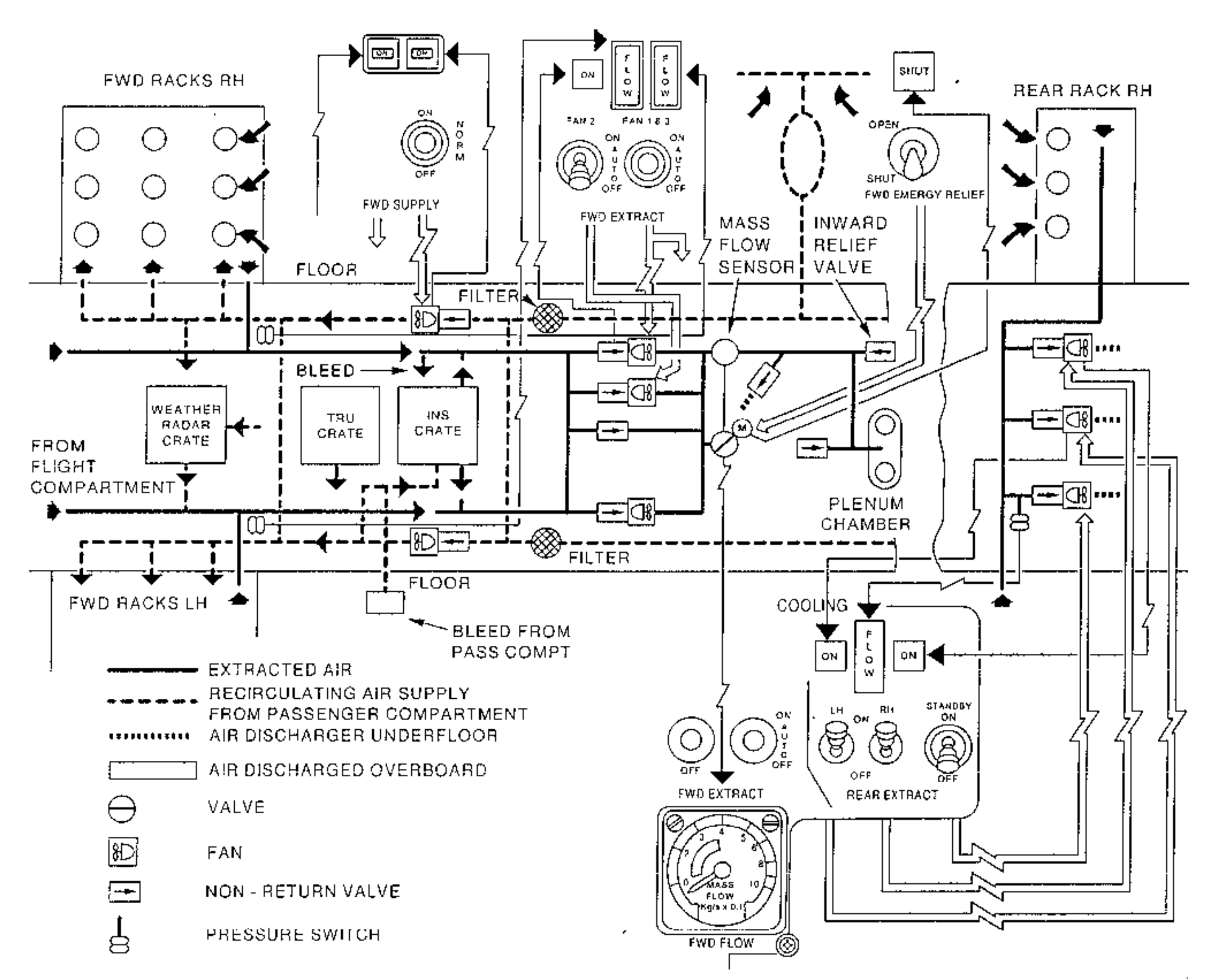


Controls and Indicators
Figure 010

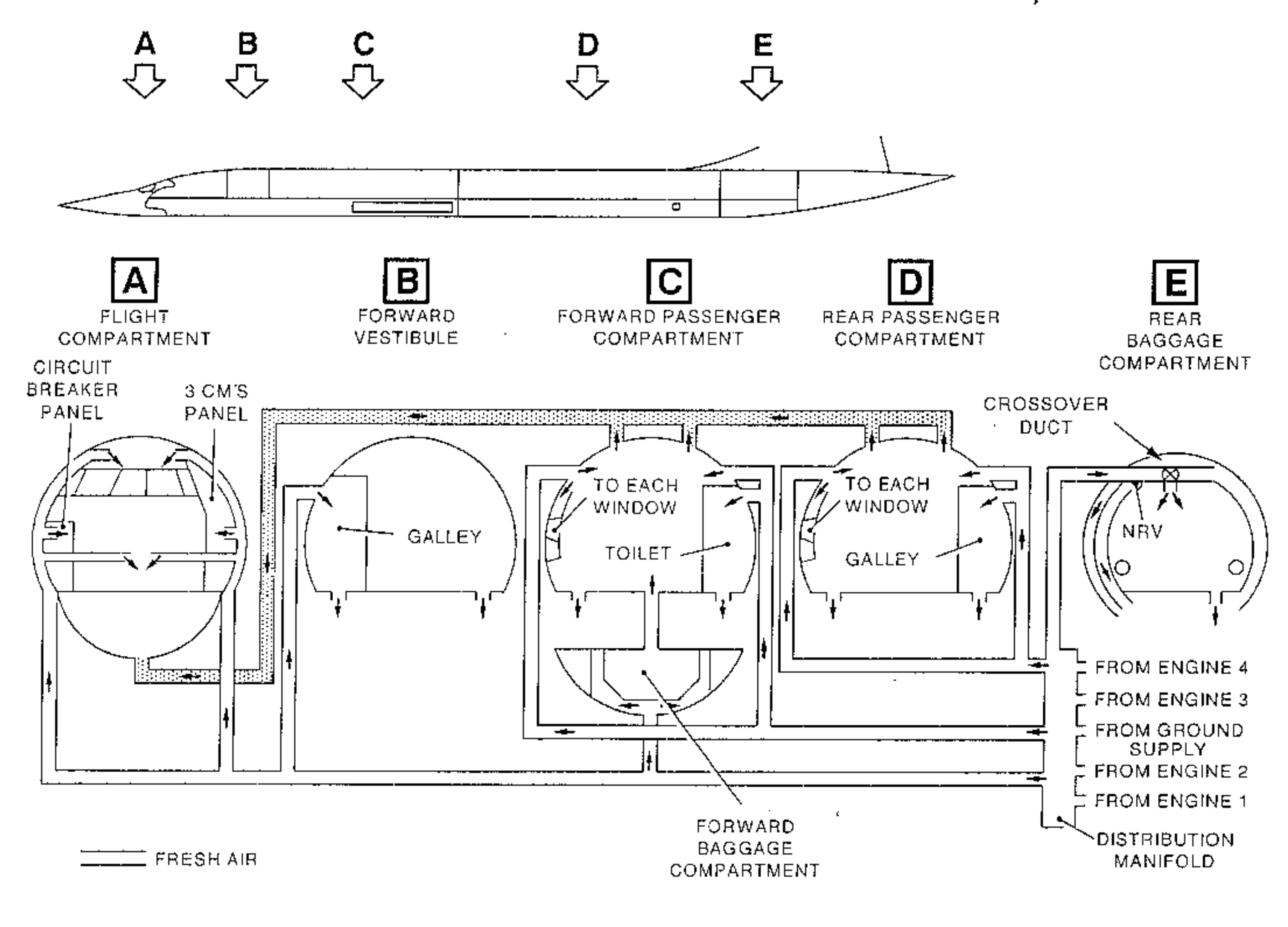


Controls and Indicators
Figure 011

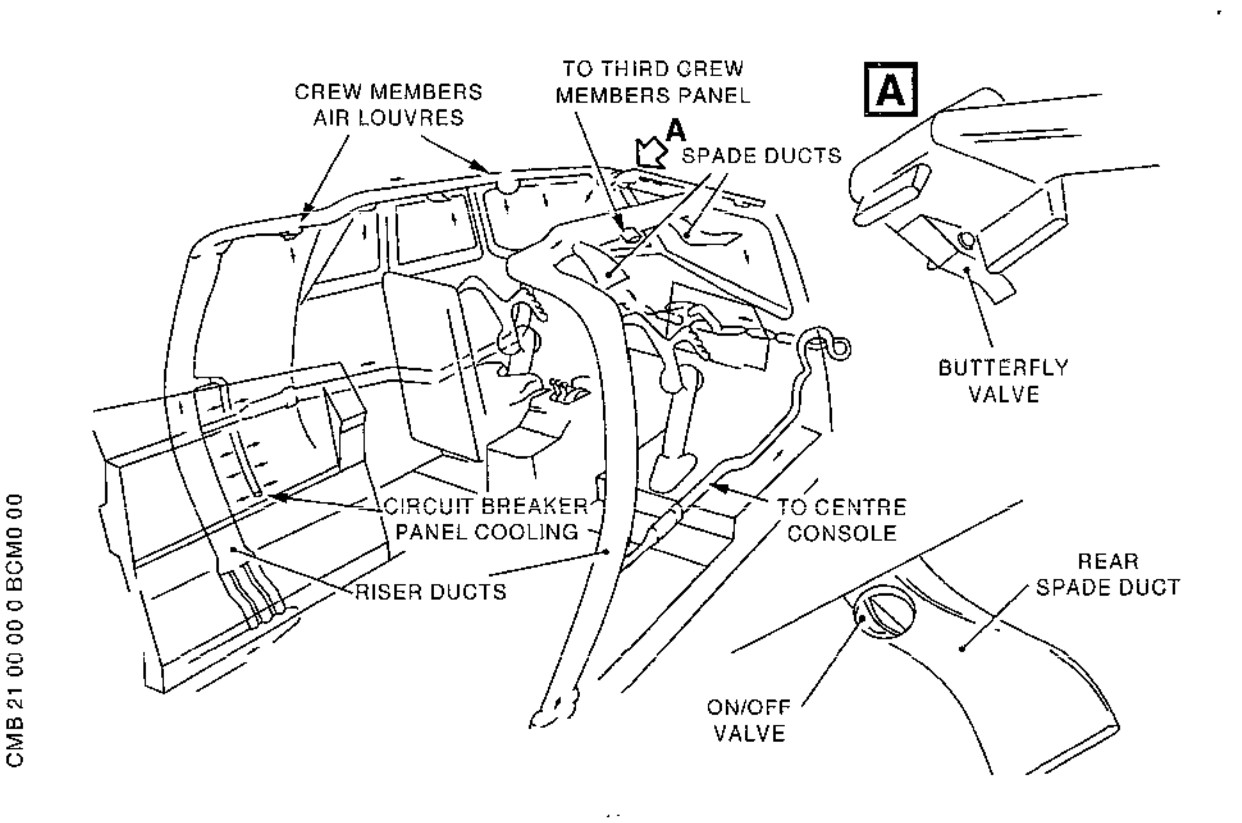
CMB 21 00 00 0 AYM0 00



Air Extraction Systems - Schematic
Figure 012



Fresh Air Distribution - Schematic
Figure 013



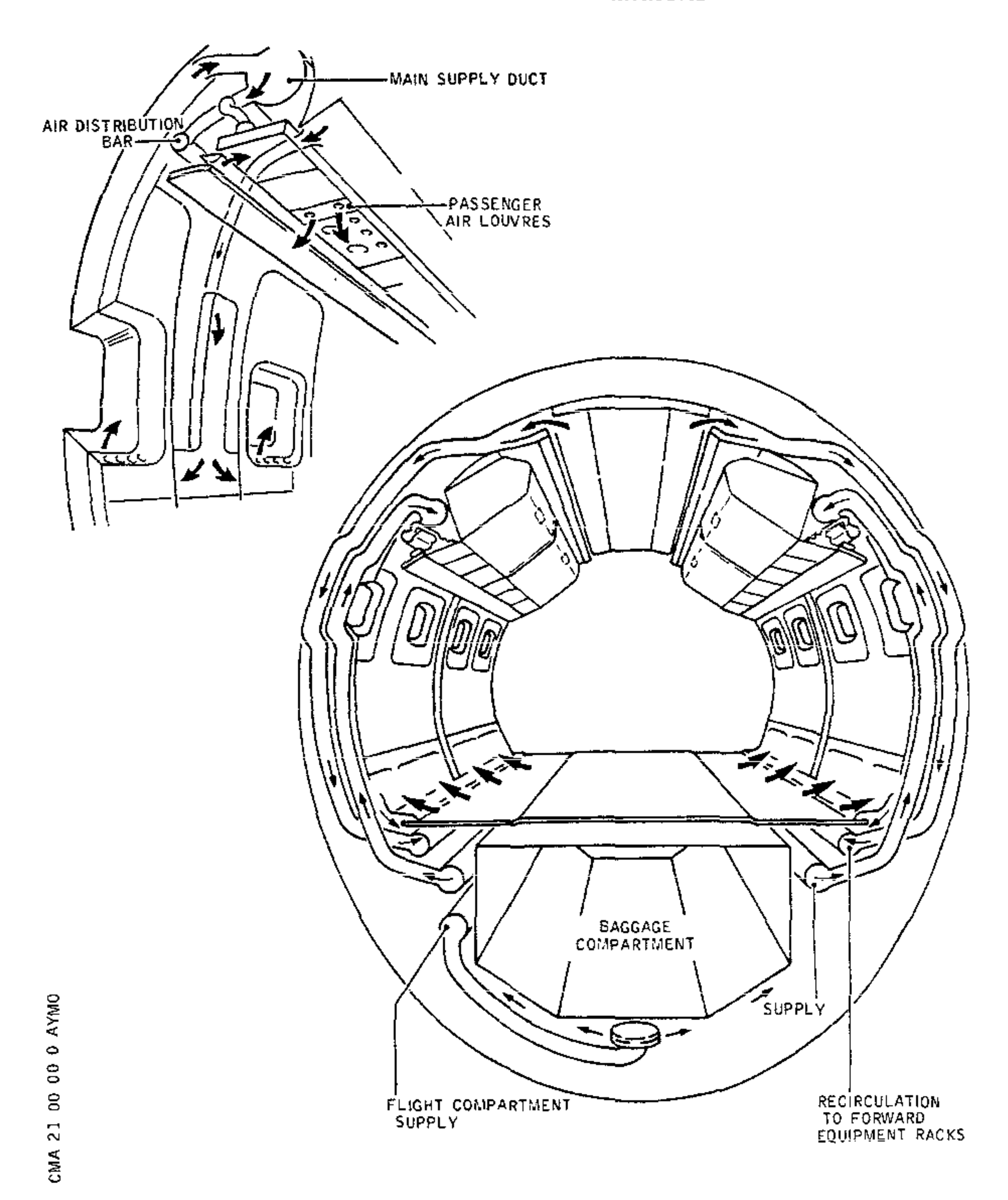
Flight Compartment Fresh Air Distribution
Figure 014

to the flight compartment and the forward and rear passenger compartments and is removed by extraction through the Flight Engineer's panel, circuit breaker panels, electronic racks, passenger compartment windows, toilets and galleys. The operation of the system follows automatically from the flows created by the air extraction systems and no supervision is required apart from the adjustment of crew and passenger louvres.

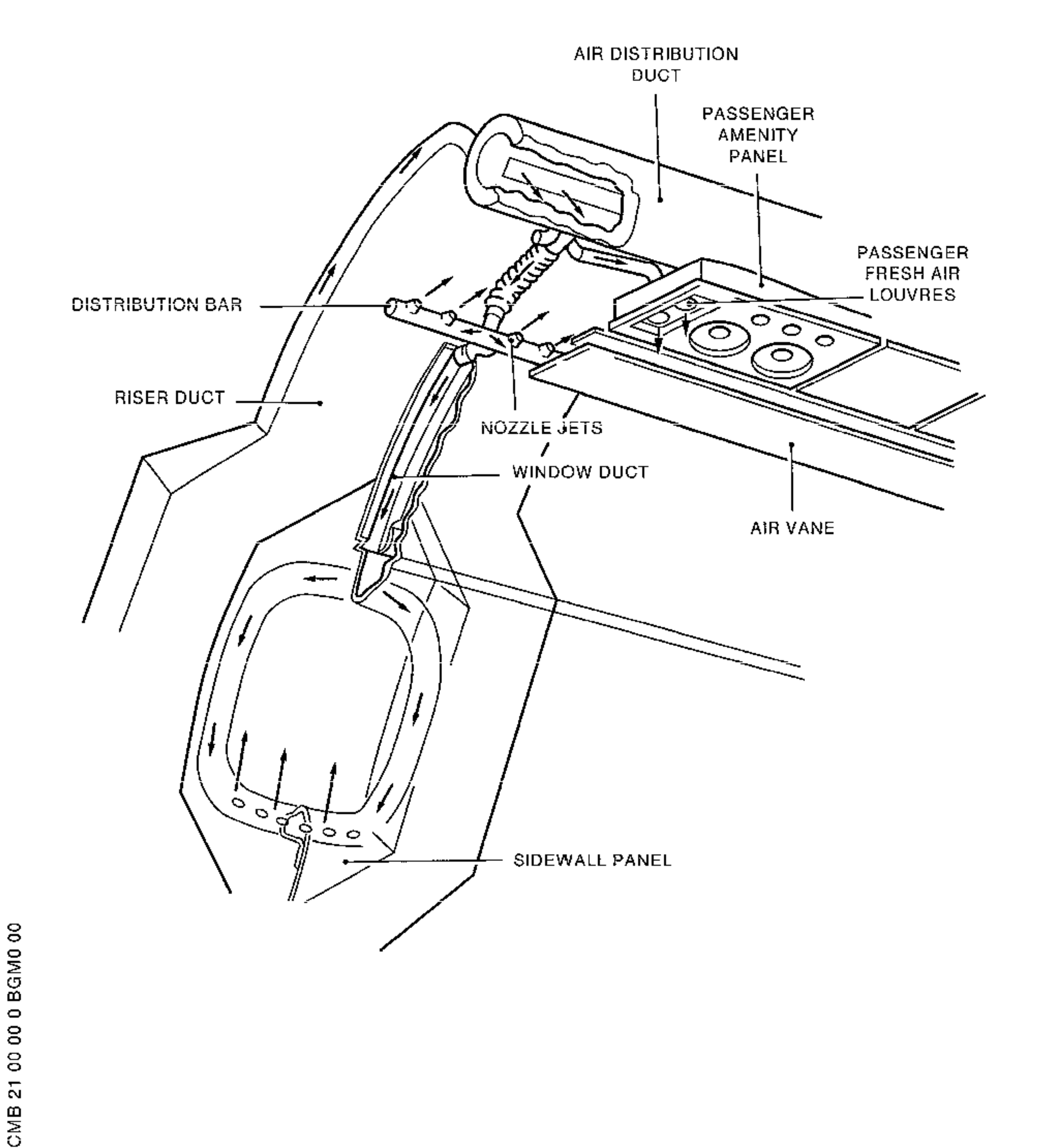
The forward baggage compartment is cooled, or heated, by air ducted from the flight compartment air supply ducts, through flexible ducts at every frame bay along its length. This air circulates around the outside of the baggage compartment.

The rear baggage compartment is ventilated by fresh air from a roof duct. By means of a changeover valve in the forward end of the duct, the air supply may be diverted via the wall ducting to the underfloor bay from where it is finally discharged overboard.

H. Forward Equipment (Hydraulic Chassis) Ventilation



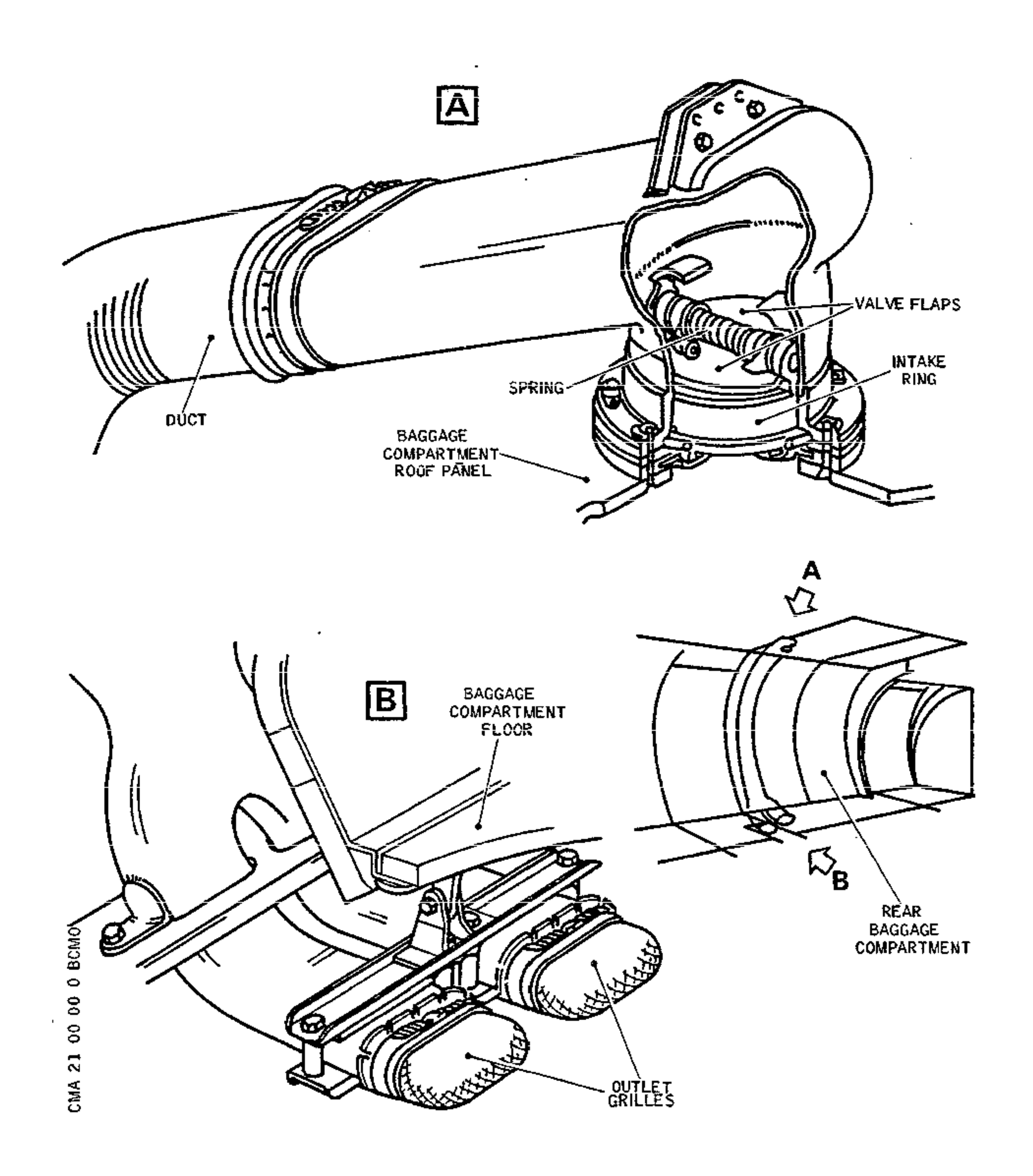
Passenger Compartment Air Flow (1)
Figure 015



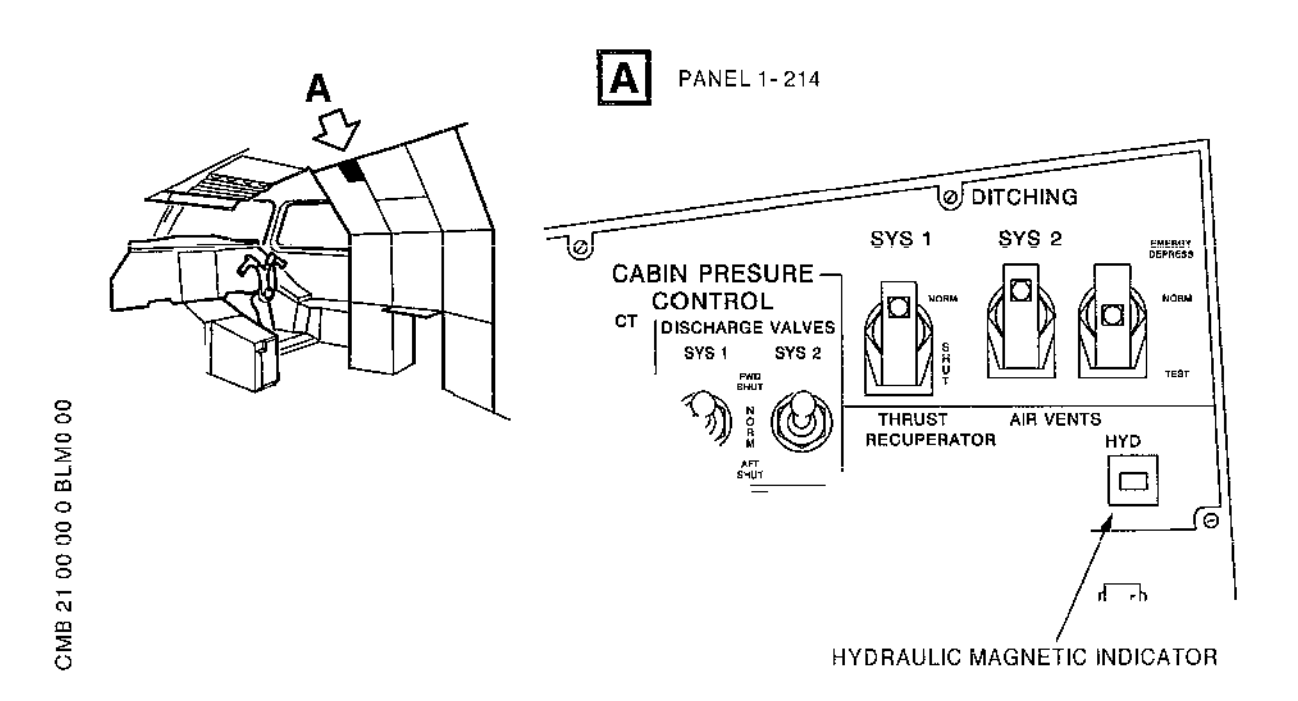
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Passenger Compartment Air Flow (2)
Figure 016



Baggage Compartment Ventilation
Figure 017



Forward Hydraulic Chassis Ventilation
Figure 018

(Ref. Fig. 018)

The forward hydraulic chassis is shrouded and ventilated to contain any hazard from hydraulic oil mist.

Ventilating air, induced by cabin differential pressure, flows from the flight compartment via the rudder pedestals and the centre console to the hydraulic chassis bay. The air is discharged overboard through a vent nozzle in the skin of the forward equipment bay via an electrically actuated butterfly vent valve. The control and indication for the valve are on the Cabin Pressure Control panel at the 3CM station, and a pressure switch provides a barometric override control of the system.

28 VDC from the main busbars supplies the ventilation valve actuator and the magnetic indicator via the pressure switch.

Check to ensure that the indicators on panel 1-214 are at the normal ground state.

J. Battery Venting System (Ref. Fig. 019)

The batteries are vented to atmosphere through two inter-connected pipes. Both pipes incorporate relief valves and drain valves, and terminate in overboard vents immediately forward of the nose gear bay.

When fitted, the flight test instrumentation batteries are vented in a similar manner to the main batteries. The system is connected to the main battery venting system near the left hand overboard vent.

The drain valves are attached to the drain outlets of the relief valves, and allow the fumes and excess pressure released by the relief valve to escape into the underfloor area. Steel receptacles retain any fluid released by the relief valves.

The system operates automatically and no supervision is required except to ensure that the drain receptacles do not go unemptied.

K. Vapour Seal/Fuel Tank Interspace - Ventilation System (Ref. Fig. 020)

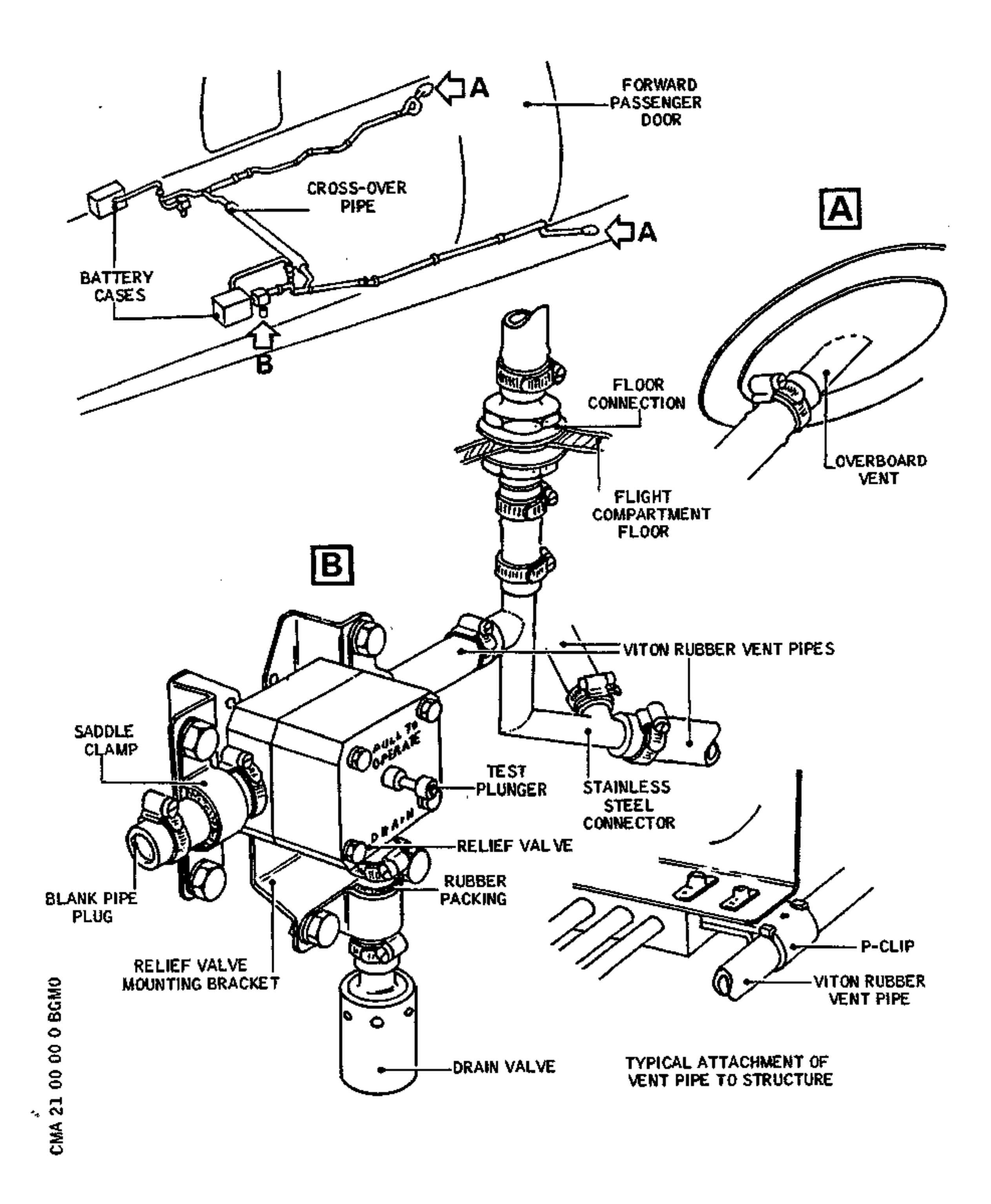
Three fuel tank systems within the fuselage are sealed, ventilated and drained to eliminate hazard from fuel leakage. Viton coated fabric membranes extend over the tops and end of tanks 6, 8, 9 and 10 and over the forward bulkhead of tank 11.

Passenger compartment discharge air is ducted from the underfloor space and the rear galley area, flows through the systems and then discharges overboard, as shown in the schematic airflow diagram. Cabin differential pressure causes the air to flow, and there is no manual or automatic controls of the system.

Fuel leaking into the vapour seal air space is passed overboard either by gravity feed through the drain pipes, or siphoned off by the air bleeds into the vent pipes from the low points of the catenary floor, and the lower part of tank 11 vapour seal.

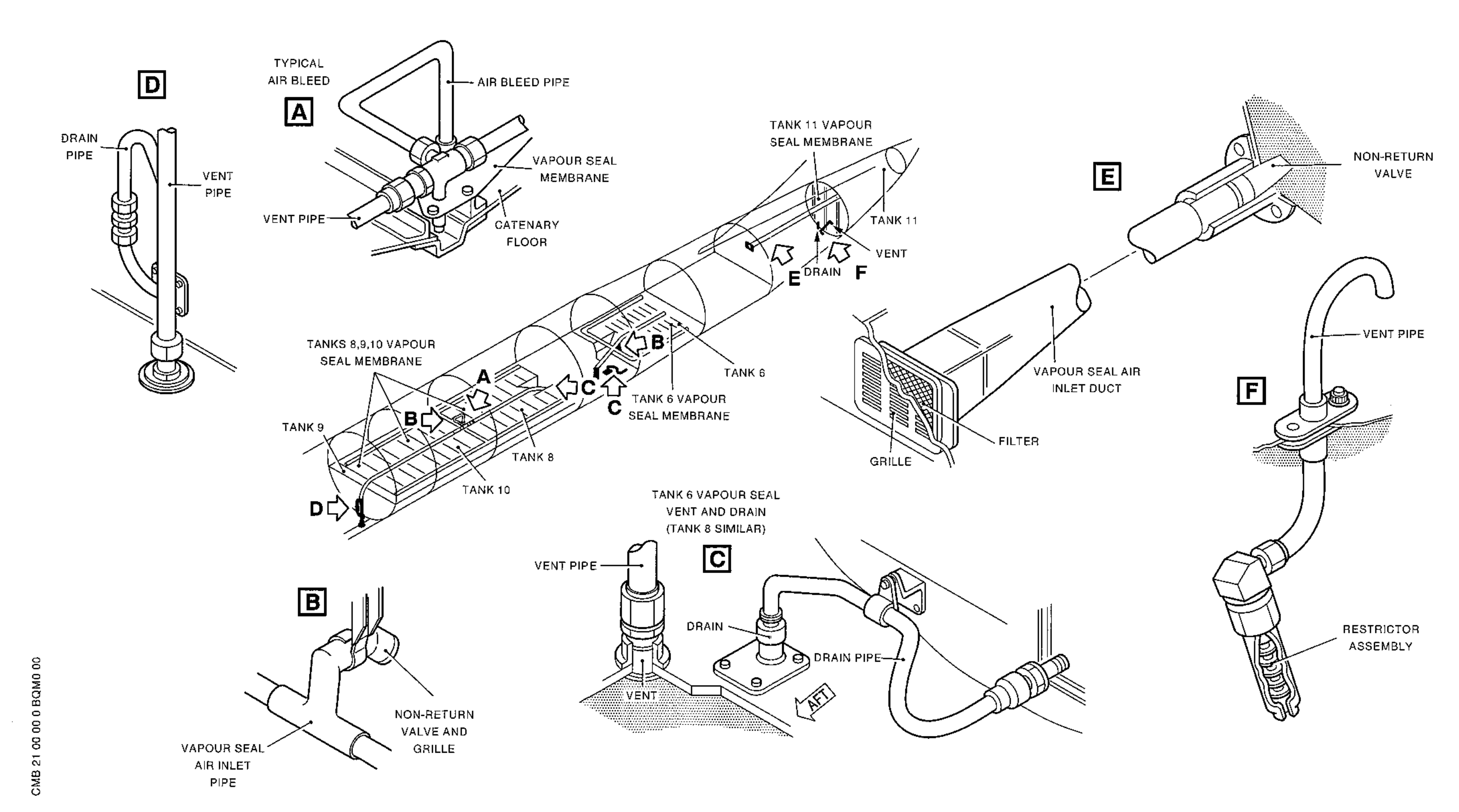
L. Rear Equipment Compartment Purging System (Ref. Fig. 021 and 022)

The rear equipment compartment is purged of fuel and hydraulic fluid vapour by air, discharged from the
R passenger compartment. Air from the compartment is
R discharged overboard through two ventilation outlets.



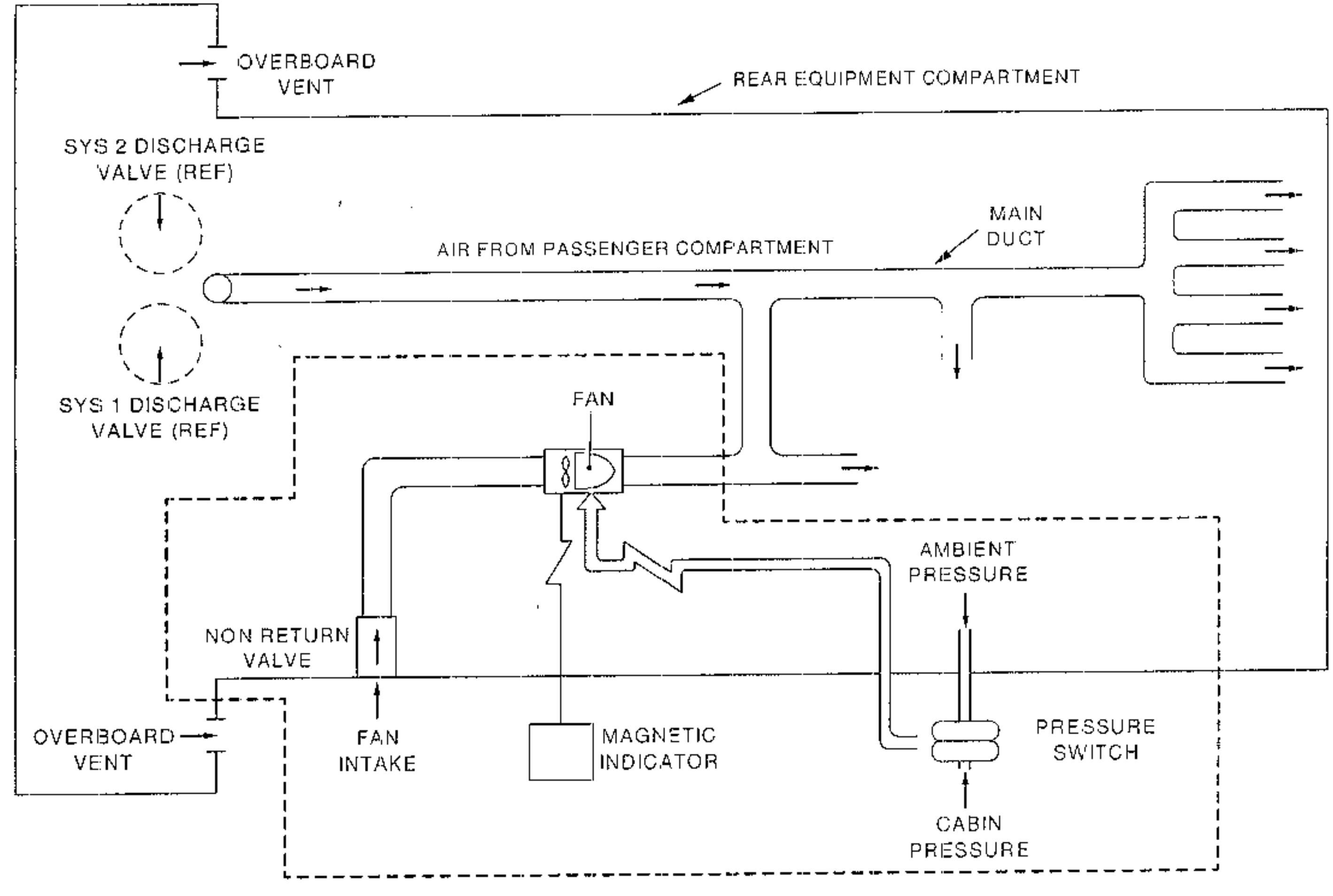
Battery Venting
Figure 019

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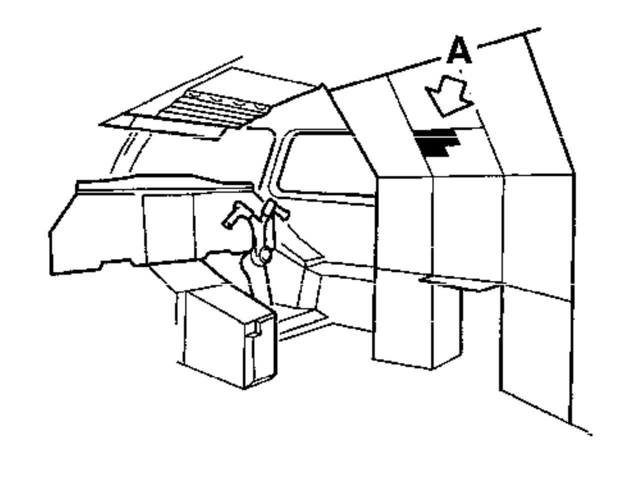
Fuel Tank Vapour Seal Ventilation
Figure 020

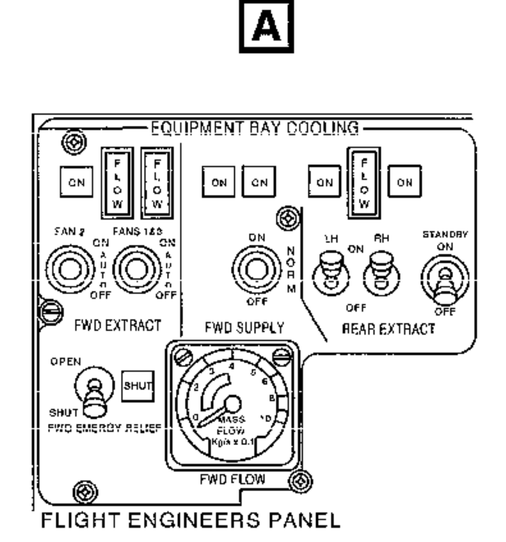
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AND MAY BE REMOVED OR ELECTRICALLY ISOLATED
AT THE OPERATORS DISCRETION.
NOTE: IF THE EQUIPMENT IS REMOVED FROM
THE AIRCRAFT, THE DUCT WILL BE SUPPORTED
AND BLANKED OFF.

Aft Equipment Compartment Purging System -
Schematic
Figure 021





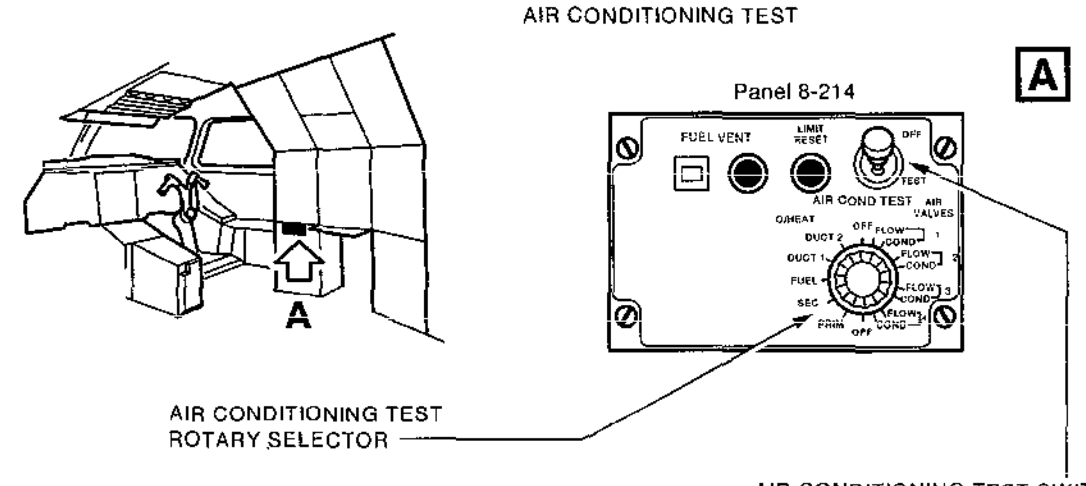
REAR BAGGAGE
COMPARTMENT DOOR
PANEL 243EF
FRAME 75
FRAME 74
PANEL 243DF

OVERBOARD VENT
OVERBOARD VENT
FAN INLET
153 FB
153 EB
153 DB
153 BB

CMB 21 00 00 0 BUM0 00

R

Controls and Indication
Figure 022



When the AIR COND TEST switch is at TEST the AIR COND TEST rotary selector is used to test the electrical circuits of the air conditioning system warnings and the electrical operation of the safety closing for the conditioning valves and mass flow valves.

AIR CONDITIONING TEST SWITCH

OFF - cuts the electrical supply to the AIR COND TEST rotary selector.
TEXT - arms the AIR COND TEST rotary selector.

AIR Conditioning Test - Panel 8-214
Figure 023

6. Check and Control on Panels

A. Flight Compartment and Air Conditioning Test (Ref. Fig.023)

AIR COND TEST switch	OFF
AIR COND TEST rotary selector	OFF

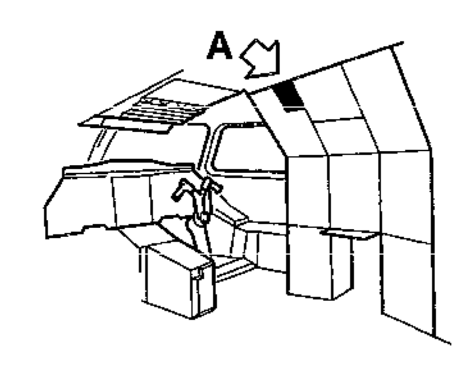
B. Flight Compartment and Cabin Pressure Control Check (Ref. Fig.024 and 025)

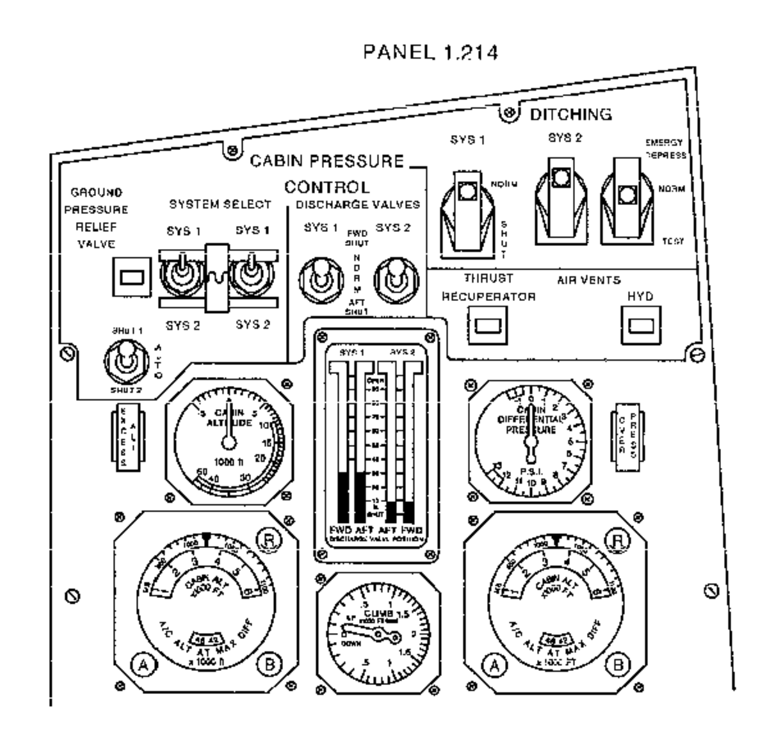
GROUND PRESSURE RELIEF VALVE switch	AUTO
GROUND PRESSURE RELIEF VALVE magnetic indicator	OPEN
SYS SELECT switches	SYS 2
DISCHARGE VALVES SYS 1 and SYS 2 switches	NORM
DITCHING SYS 1 and SYS 2 switches	NORM
EMERGY DEPRESS switch	NORM
THRUST RECUPERATOR magnetic indicator	OFF
AIR VENT HYD magnetic indicator	OPEN

EXCESS ALT light pressed	
- EXCESS ALT light	RED
- MWS PRESS light	RED
- Audio	GONG and HORN
CABIN ALTITUDE indicator pointer	Airfield press altitude
CABIN DIFFERENTIAL indicator pointer	0
O/PRESS light pressed	
- O/PRESS light	RED
- MWS PRESS light	RED
- AUDIO	GONG
On SYS 1 CABIN ALT selector (then SYS 2)	
- Rotate knob B to set cursor at	1013 mb
= Rotate knob A to set cabine altitude to that required for the flight	Altitude shown in lower window is higher than the highest flight level planned for the cruise
- Rotate knob R to set cabin rate of climb, White dot is approx. 400 ft./min.	
SYS 1 and SYS 2 DISCHARGE VALVE POSIT ind FWD and AFT	OPEN
Set SYS SELECT switch to :	SYS 1
SYS 1 and SYS 2 DISCHARGE VALVE POSIT ind FWD AFT	OPEN
Set DISCHARGE VALVES SYS 1 and SYS 2 selectors to :	FWD SHUT then NORM
- SYS 1 and SYS 2 FWD discharge valve position indicators move toward	SHUT then OPEN
Set DISCHARGE VALVES SYS 1 and SYS 2 selectors to :	AFT SHUT then NORM
- SYS 1 and SYS 2 AFT discharge valve position indicators move toward	SHUT then OPEN
Cabin rate of climb indicator	0

C. Flight Compartment Air Bleed Control Panel Check (Ref. Fig.026 and 027)

DUCT lights (4)	OFF
FUEL EXCH lights (4)	OFF
SEC EXCH lights (4)	OFF
PRIM EXCH lights (4)	OFF
OVER PRESS lights (4)	OFF
Set BLEED VALVES switches (4) to :	OPEN
OVER PESS lights (4) pressed	
- OVER PESS lights (4)	AMBER
- MWS AIR light	AMBER





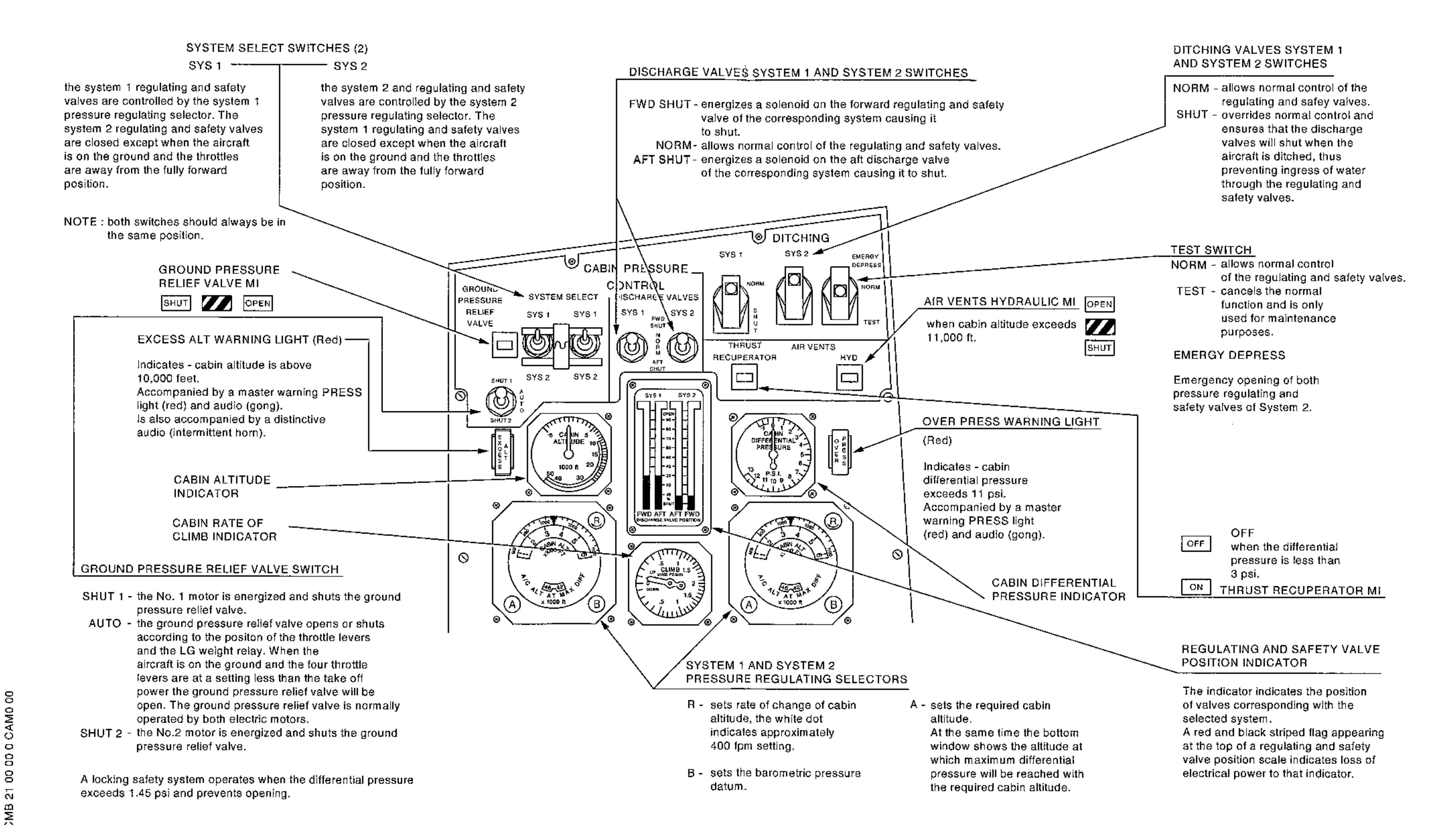
CMB 21 00 00 0 BYM0 00

Cabin Pressure Control Panel 1-214
Figure 024

- Audio	GONG
Set BLEED VALVES switches (4) to :	SHUT
BLEED VALVES MI's (4)	Crossline
BLEED pressure gauges (4)	0 approx.
CROSS BLEED switches (4)	SHUT
CROSS BLEED MI's (4)	Crossline
COND. VALVE sels (4)	OFF
COND. VALVE MI's (4)	Crossline
JET PUMP MI's (4)	Crossline
RAM AIR MI's (4)	Inline
FUEL VALVE selectors (4)	AUTO
FUEL VALVE MI's (4)	Inline or Crossline
TCV position indicators (4)	approx. C

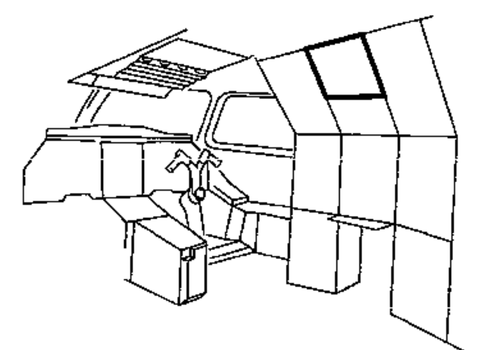
D. Flight Compartment Equipment Bay Cooling Panel Check

FLOW warning lights (3) (Amber)	OFF
FWD EM RELIEF switch	OPEN then SHUT
FWD EM RELIEF MI	OPEN then SHUT
FWD SUPPLY switch	NORM
FWD EXTRACT STANDBY switch	OFF
FWD EXTRACT MAIN switch	AUTO



Cabin Pressure Control Panel 1-214
Figure 025

AIR BLEED CONTROL PANEL AND TEMPERATURE CONTROL PANEL



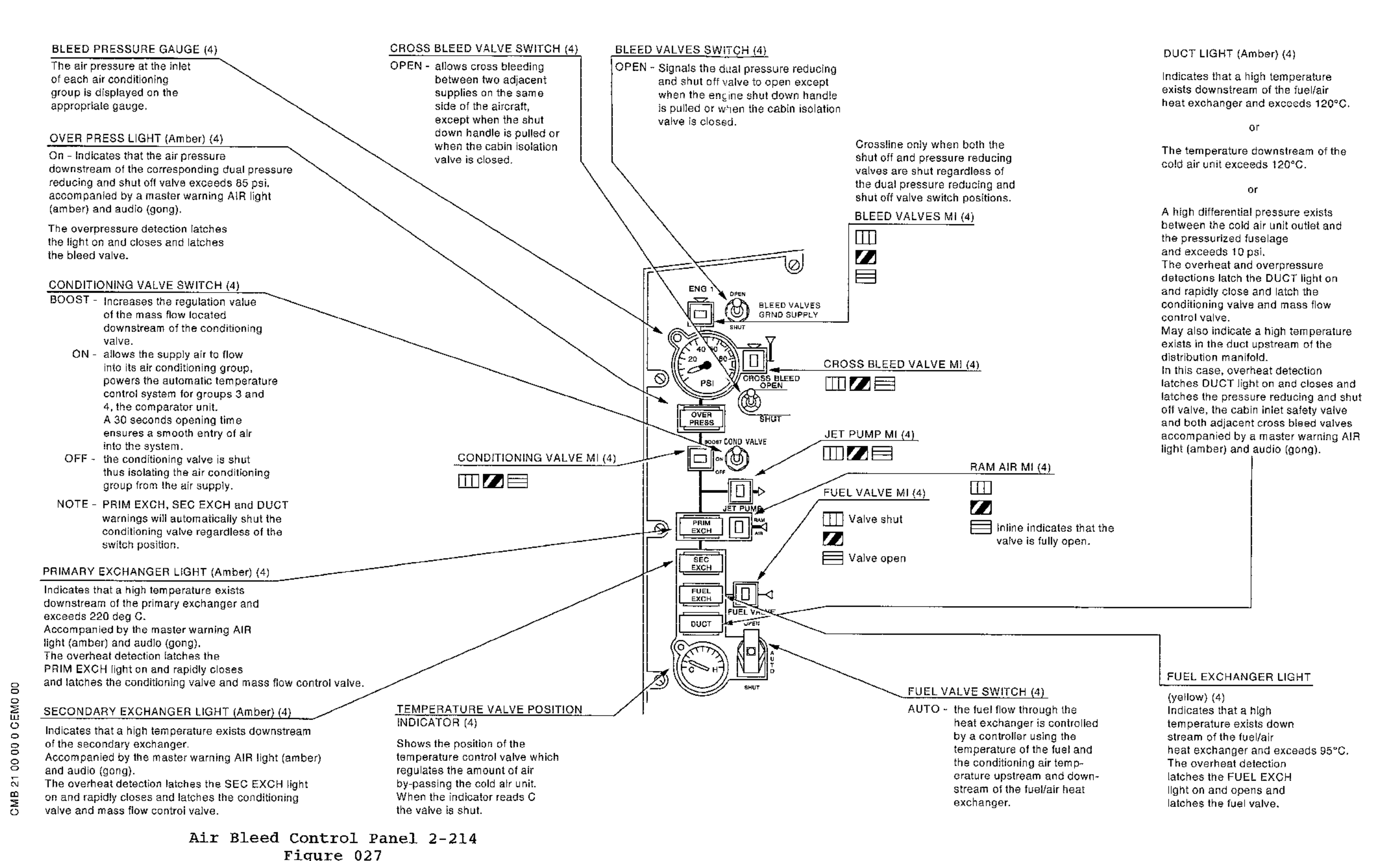
AIR BLEED CONTROL
ENG 1 ENG 2 ENG 3 ENG 4
BLEED VALVES OPEN CLOSE GRND SUPPLY
PSI
CROSS BLEED OPEN SHUT
OVER PRESS
COND VALVE
JET PUMP
PRIM EXCH
SEC EXCH
FUEL EXCH
FUEL VALVE
DUCT

TEMPERATURE CONTROL
LEAK
CABIN DUCT °C
MASS FLOW
FLIGHT DECK
FWD CABIN
ON FAILED
GROUP 3 OR 4
COMPARATOR
REAR CABIN
ON GROUP 1 FAILED
ON GROUP 2 FAILED
AUTO COLD HOT STANBY
TEMPERATURE SELECTORS

PANEL 2.214

Air Bleed Control Panel 2-214
Figure 026

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CMB 21 00 00 0 CEM0 00

Air Bleed Control Panel 2-214
Figure 027

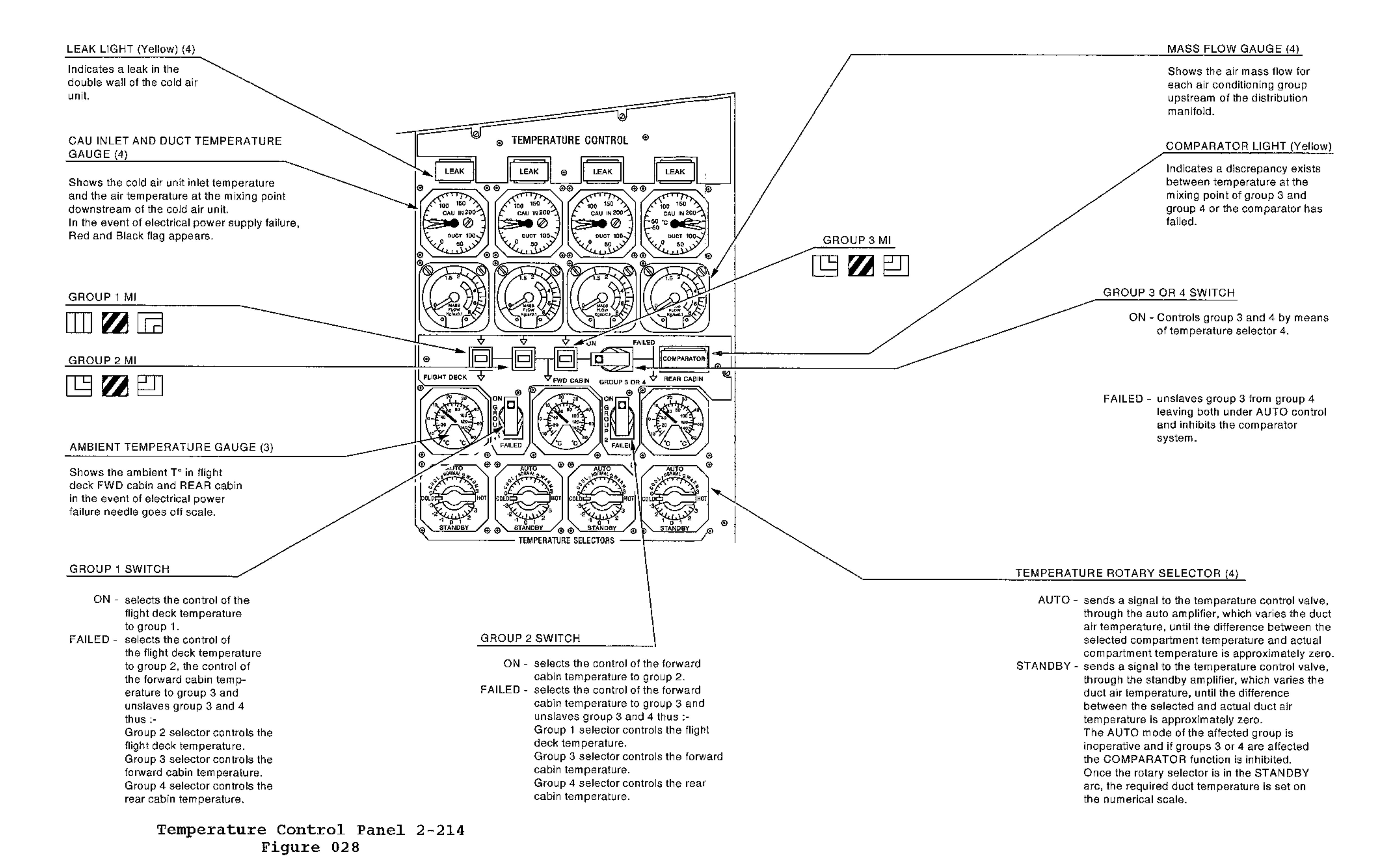
FWD EXTRACT MAIN MI	ON
REAR EXTRACT LH and RH switches	ON
REAR EXTRACT MIs (2)	ON
REAR EXTRACT STANDBY switch	OFF
FWD FLOW gauge	Above amber arc

R

E. Flight Compartment Temperature Control Panel Check (Ref. Fig. 026 and 028)

LEAK lights (4)	OFF
CAU in temperature gauges (4)	Sensible readings
DUCT temperature gauges	Sensible readings
MASS FLOW gauges (4)	0
GROUP 1 switch	ON
GROUP 2 switch	ON
GROUP 3 or 4 switch	ON
GROUP 3 or 4 MI	Shows line from GROUP 3 to REAR CABIN
COMPARATOR light	OFF
FLIGHT DECK temp.	Sensible reading
FWD CABIN temp.	Sensible reading
REAR CABIN temp.	Sensible reading
Rotate GR 1, GR 2, GR 3, GR 4 temp. sel. to	AUTO and STANDBY

INTENTIONALLY BLANK



Temperature Control Panel 2-214
Figure 028

1. Isolation - Safety System

R A. Dual Pressure Reducing Shut Off Valve - Manual Closing (Ref. Fig. 301)

(1) General

After an overpressure warning, the dual pressure re-
R ducing shut off valve may not close (mechanical system faulty). In this case the group is shut down by closing the air conditioning valve.
The dual pressure reducing shut off valve can be locked closed manually when the aircraft is on the ground. The closing of the valve makes it possible to have air supplied by the air conditioning group previously shut down, via the cross bleed system.

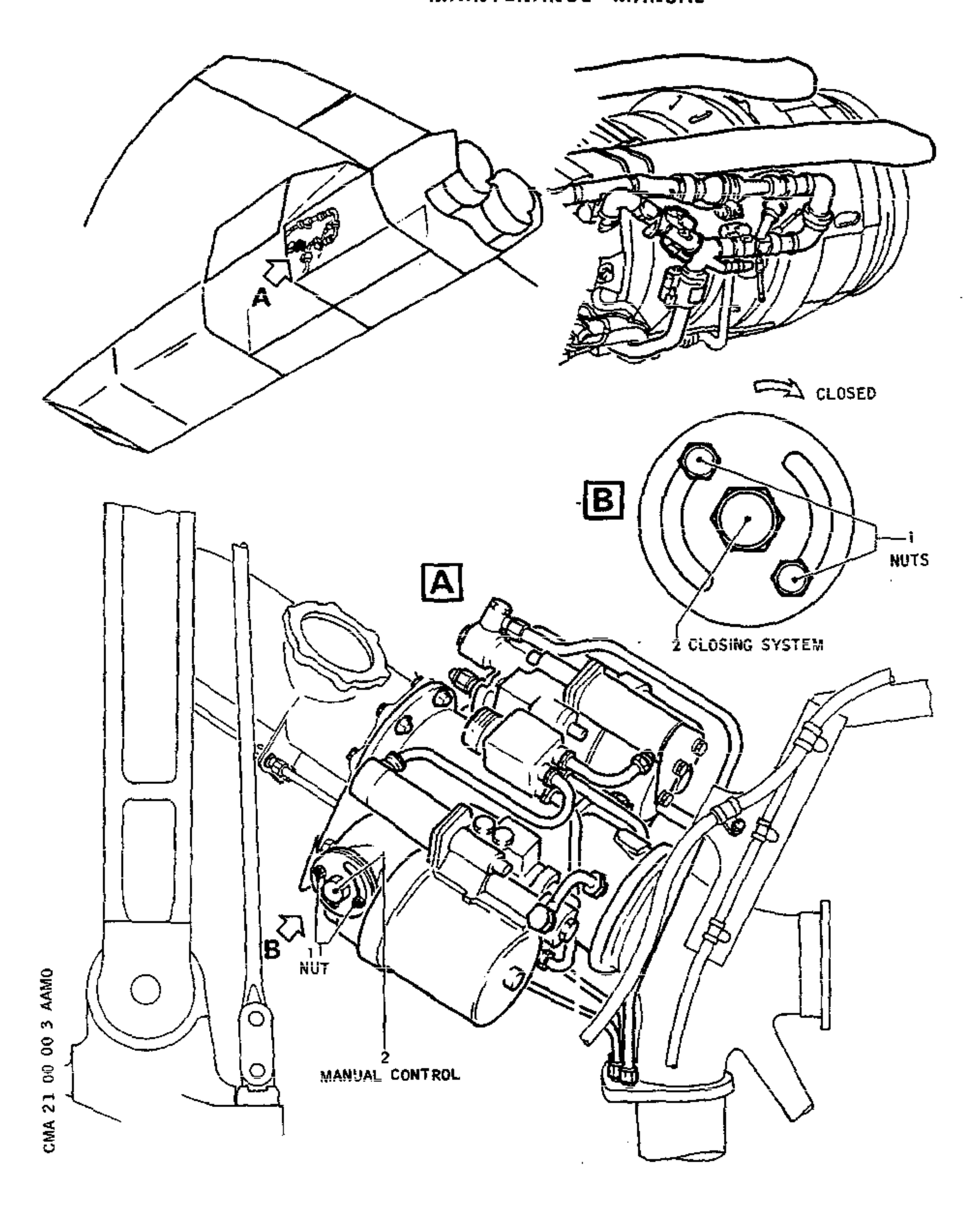
(2) Valve Closing

(a) On the nacelle, open one of the following access doors :

451 CL for group 1 valve
426 CR for group 2 valve
435 CL for group 3 valve
446 CR for group 4 valve

(b) On the valve, unlock both nuts (1), move manual control (2) by a quarter turn towards the right.
R Lock nuts (1).

(c) Close access door.



Dual Pressure Reducing and Shut Off
Valve Manual Closing
Figure 301

B. Air Conditioning Valve Manual Closing (Ref. Fig. 302)

(1) General

On the ground the air conditioning valve can be locked in closed position. When the valve is closed, it is possible to use the air bled by the faulty group to supply the adjacent air conditioning group ; the air is transferred via the cross bleed system.

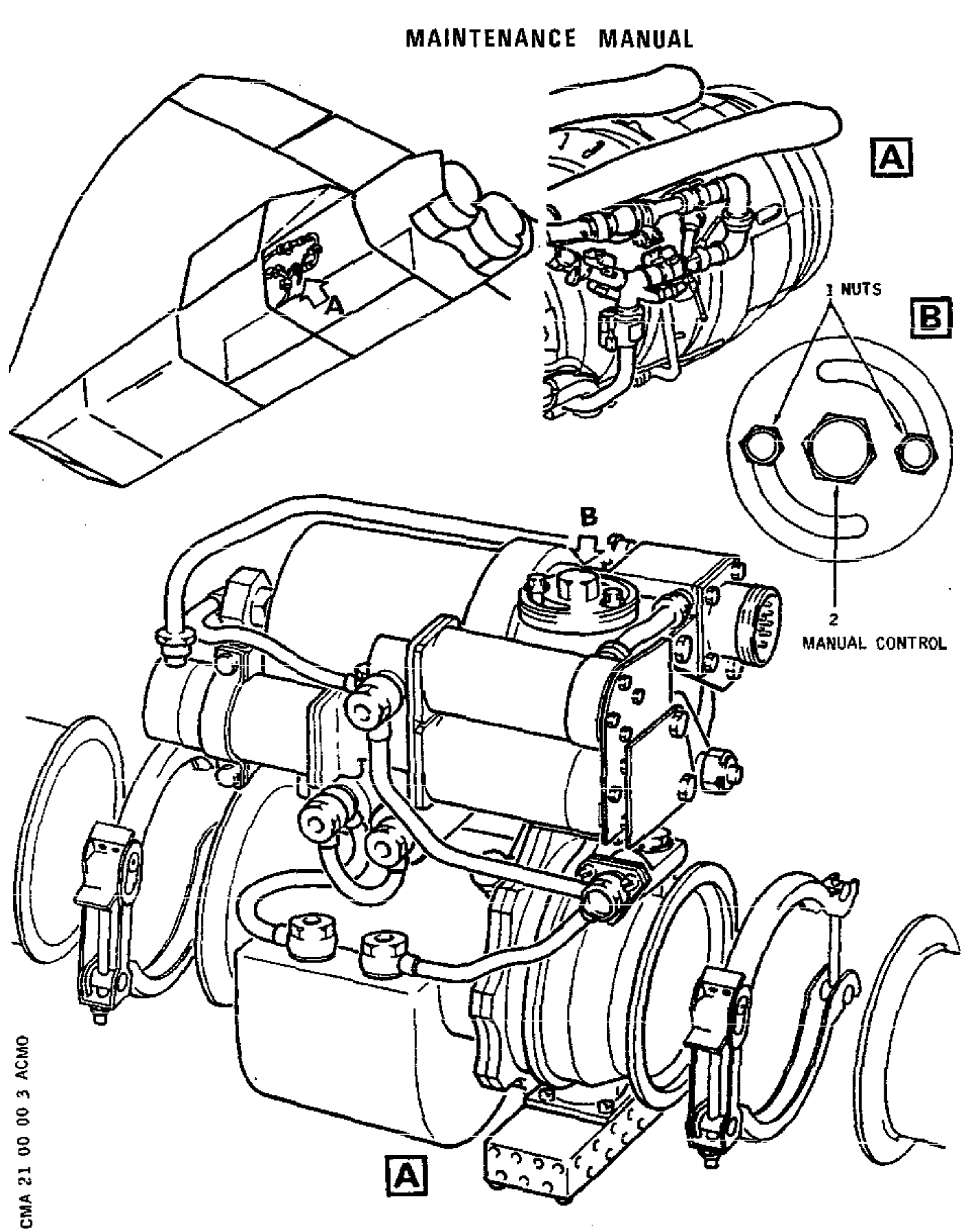
(2) Valve closing

(a) On the nacelle, open one of the following access doors :

415 CL for group 1 valve
426 CR for group 2 valve
435 CL for group 3 valve
446 CR for group 4 valve

(b) On the valve, unlock both nuts (1), rotate manual
R control (2) a quarter turn towards the right. Lock
R nuts (1).

(c) Close access door.



Air Conditioning Valve Manual Closing
Figure 302

C. Primary Heat Exchanger Ram Air Control Valve Manual Opening (Ref. Fig. 303)

(1) General

On the ground, it is possible to manually lock the valve in open position.
This operation enables correct cooling of primary heat exchanger.

(2) Valve Opening

(a) Open one of the following access doors :

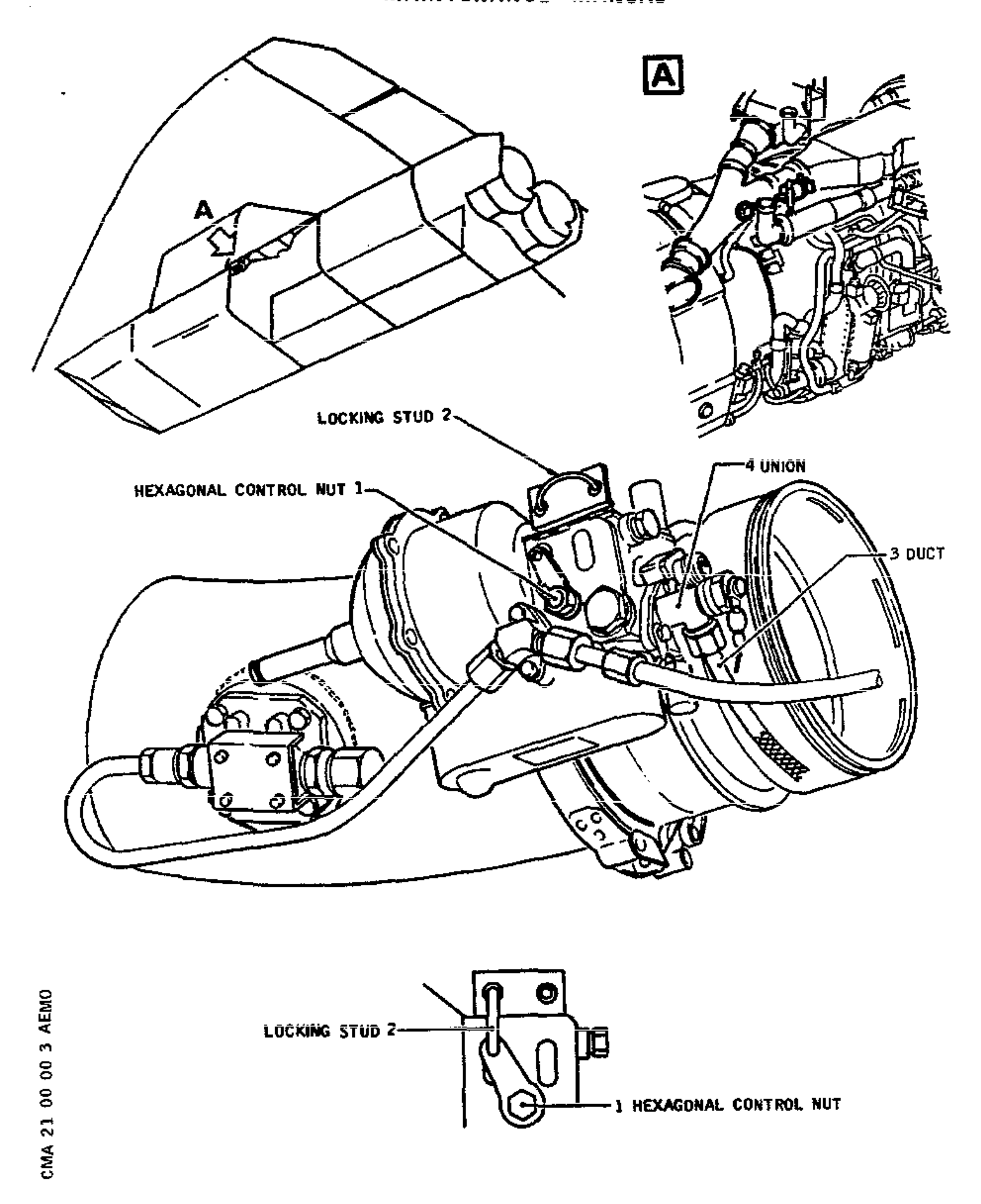
415 AL for group 1 valve
426 AR for group 2 valve
435 AR for group 3 valve
446 AR for group 4 valve

(b) Rotate hexagonal nut (1) towards the left until hole in position indicator coincides with hole in valve body.
Pull locking stud (2) ; rotate it and place it in the holes.

R

(c) Close-Up

Close access door.



Primary Heat Exchanger Ram Air Control
Valve Manual Opening
Figure 303

D. Fuel Control Valve Manual Opening
(Ref. Fig. 304)

(1) General

If the fuel control valve motor fails, it is possible to lock the valve in full open position to enable cooling of the fuel heat exchanger.

R (2) Equipment and Materials

DESCRIPTION	PART NO.
R Electrical connector blanking cap	

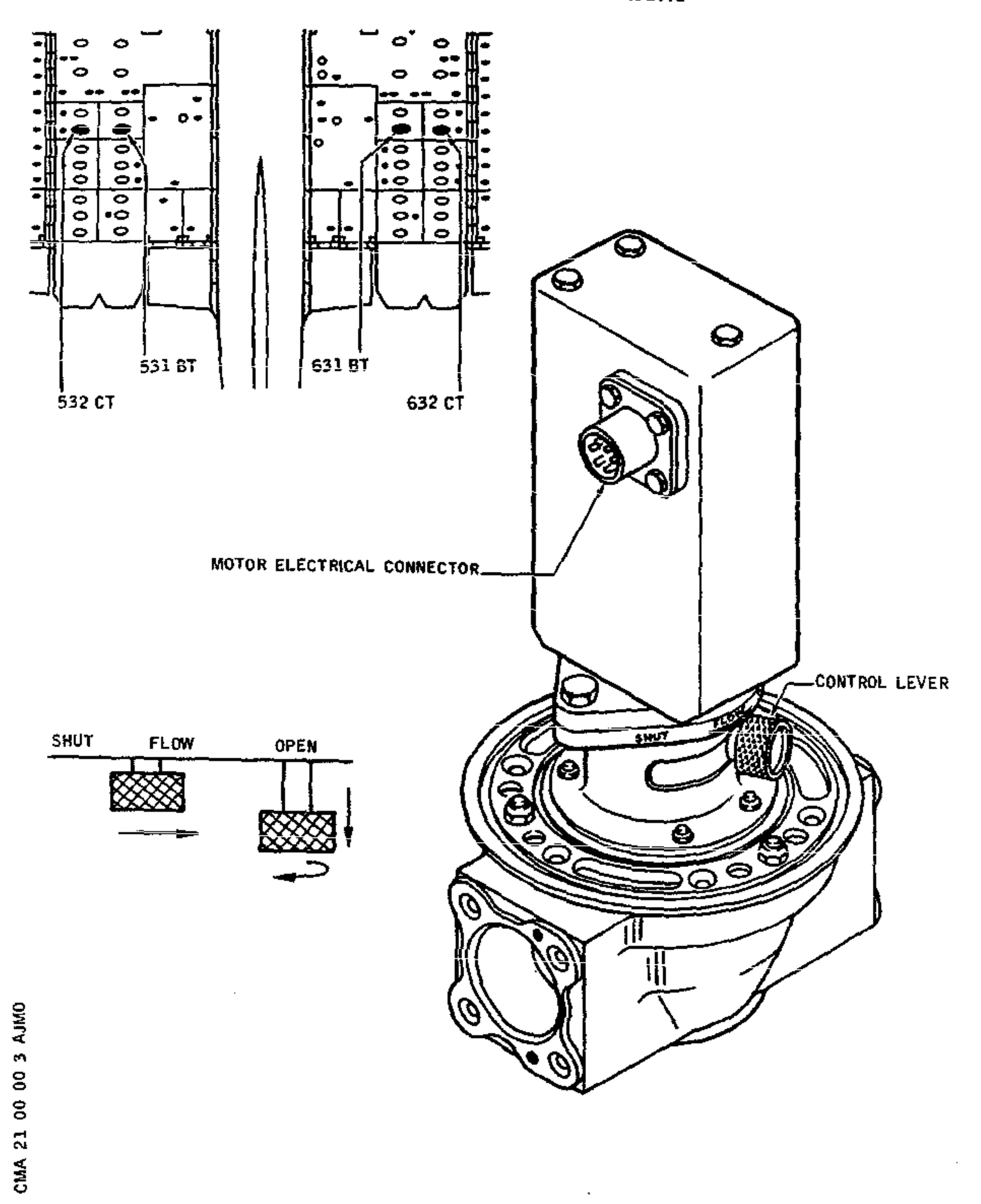
R (3) Valve Opening

(a) On wing, open one of the following access doors :

532 CT for group 1 valve
531 BT for group 2 valve
631 BT for group 3 valve
632 CT for group 4 valve

(b) Move control lever (1) counterclockwise towards
R the OPEN position.
R The OPEN marking is engraved in the valve body.
When the lever reaches the end of its travel, pull it and turn it by a quarter turn.

NOTE : When the valve is manually locked in
R open position, the valve motor electrical
R connector shall be disconnected and isola-
R ted. Coil and attach wires; cap electrical
R connector.
R FUEL VALVE magnetic indicator displays
R stripes on AIR BLEED CONTROL panel.



Fuel Control Valve Manual Opening
Figure 304

GENERAL - REMOVAL/INSTALLATION

R 1. General

R The swivel joints are installed on air conditioning ducts so
R that the latter can be easily installed and removed.
R The removal/installation procedure is identical for all swivel
R joints, thus it will be dealt with only in this topic.

R 2. Swivel Joint

R A. Equipment and Materials

DESCRIPTION	PART NO.
Special Products (Ref. 20-30-00, No. 104)	
Special Products (Ref. 20-30-00, No. 105)	
Lockwire (Dia. 0.0275 (0.7 mm)) - Corrosion Resistant Steel	

R B. Prepare

R Access is gained to the various swivel joints through the
R following access doors
R 534ET, 533FT, 541AB, 542AB, 151BB, 633FT, 634ET, 642AB,
R 641AB.

R C. Remove (Ref. Fig. 401)

R (1) Remove heat insulating sleeve (1).

R (2) Disconnect bonding strip (2).

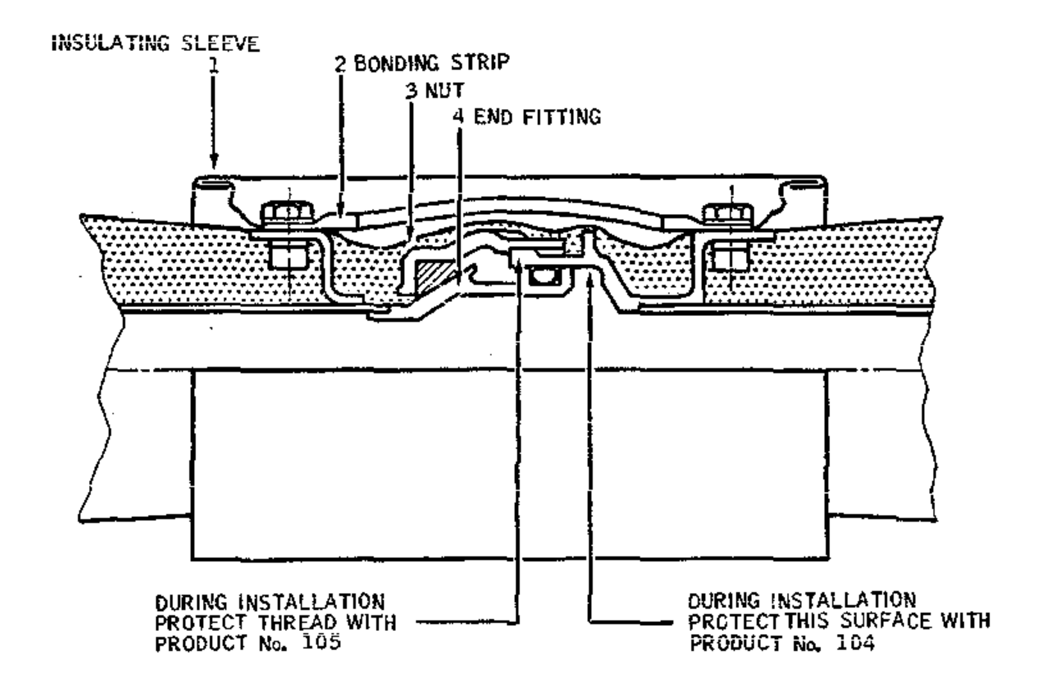
R (3) Remove lockwire and unscrew nut (3).

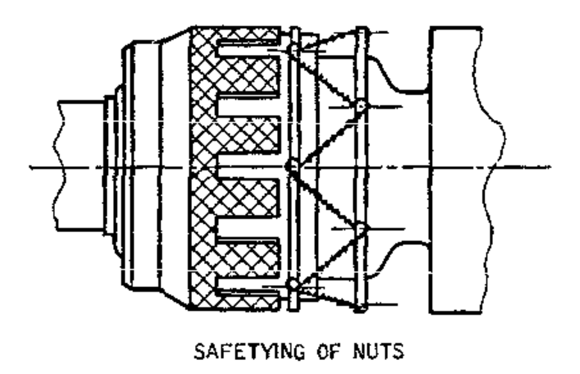
R D. Install

R (1) Screw nut (3).

R NOTE : Nut (3) must be tightened by hand until stop
R on end (4) is reached in order that no play
R exits between the ducts.
R The thread must not show.

R (2) Locknut (3).





SAFETYING OF NUTS

CMA 21 00 00 4 AAM0

R

Swivel Joint
Figure 401

(3) Connect bonding strip (2).

E. Leakage Test

(1) Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Ground Air Supply Unit - Relative minimum Pressure : 2 bars Minimum airflow 0.4 kg/s - Relative Maximum Pressure : 4.5 bars maximum airflow 0.6 kg/s The temperature must not exceed 300°C	
Circuit Breaker Safety Clips	

(2) Prepare

(a) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(b) Connect ground air supply unit.

(c) On AIR BLEED CONTROL panel 2.214, check that the following switches are in the position indicated below :
BLEED VALVE switch in SHUT position
CROSS BLEED switch in SHUT position
COND VALVE switch in OFF position.

(d) Place FUEL VALVE switch in OPEN position then in SHUT position. Check that the fuel control valve position changes on FUEL VALVE magnetic indicator (time delay). Place switch back to the AUTO position.

(e) It is required that an observer be under the nacelle and connected to the flight compartment by telephone.

(f) Trip, safety and tag the air start valves circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 1 & 4 AIR START CONT	15-215	K 181	C15
ENG 2 & 3 AIR START CONT	15-216	K 182	C11

WARNING : BEFORE STARTING THE TEST, MAKE CERTAIN THAT IN ENGINE ZONE, THE AIR START VALVES ARE CLOSED ; THE POSITION INDICATOR OF THE MANUAL CONTROL MUST BE PLACED IN SHUT POSITION.

(g) On FUEL MANAGEMENT panel 5-214, pressurize the fuel supply system of corresponding Cold Air Unit.
Check on level indicator that the minimum quantity of fuel is 2500 kg in the appropriate feed tank. Two out of the three ENGINE FEED PUMP switches associated with each feed tank are in ON position.
The corresponding LOW PRESS caption light goes off within 3 seconds.

(h) In case fuel system cannot be used, trip safety and tag the following landing gear relays circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GROUP 1			
LH.UC WEIGHT SW "A" SYS SUP	1-213	G 292	M17
GROUP 2			
LH.VC WEIGHT SW "B" SYS SUP	3-213	G 293	B 8
GROUP 3			
RH.VC WEIGHT SW "B" SYS SUP	3-213	G 294	B 9
GROUP 4			

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RH.VC WEIGHT SW "A" SYS SUP	1-213	G 295	M18

WARNING : DURING TEST, FUEL EXCH WARNING LIGHT MAY COME ON. ON AIR BLEED CONTROL PANEL 2-214, PLACE FUEL VALVE SWITCH IN OPEN POSITION (SELF HOLDING CANCELLATION).

(3) Test

(a) Start up ground air supply unit.

(b) On AIR BLEED CONTROL panel 2-214 place CROSS BLEED switch in OPEN position and COND VALVE switch in ON position.
On TEMPERATURE CONTROL panel 2.214, a flow indication is displayed on MASS FLOW indicator.

(c) Check for leakage at level of swivel joints.

(d) On AIR BLEED CONTROL panel 2.214 place COND VALVE switch in OFF position and CROSS BLEED switch in SHUT position.

(e) Shut down ground air supply unit.

(4) Close-Up

(a) Install heat insulation sleeve (1).

(b) Disconnect ground air supply unit.

(c) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2E (2) (g).

(d) Restore the fuel system to initial state.

(e) Remove safety clips and tags and reset the landing gear circuit breakers if they have been tripped.

(f) De-energize the aircraft electrical network and disconnect electrical ground power unit.

(g) Close access doors.

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GENERAL - ADJUSTMENT/TEST

1. General

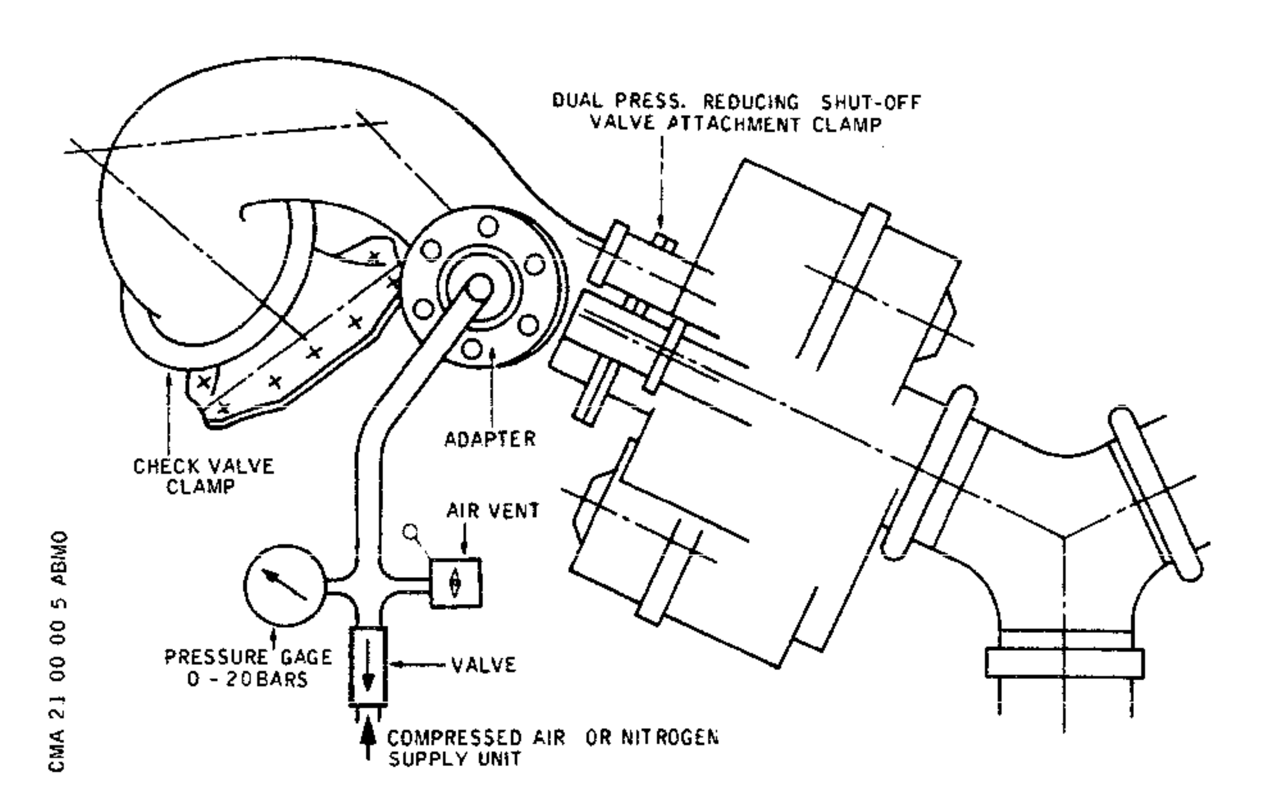
The purpose of the test is to check an entire air conditioning system for correct operation.

2. Leakage Test

The purpose of this test is to check for leakage at level of clamp attaching check valve to engine air bleed duct and at level of dual pressure reducing shut-off valve upstream attachment clamp, and to check that the internal pressure leaks do not exceed the permissible value.

A. Equipment and Materials (Ref. Fig. 501)

DESCRIPTION	PART NO.
Adapter - Air Conditioning Bleed Duct Leak Check	TE8751E21284001
Compressed Air or Nitrogen Supply Unit Supplying Pressure of 14 bars (203.04 psi)	
A Test Equipment Arranged According to the Following Figure	



Test Equipment
Figure 501

B. Prepare

(1) On AIR BLEED control panel 2-214, check that BLEED VALVE switch is in SHUT position.

(2) Open access doors :

415CL for group 1
426CR for group 2
435CL for group 3
446CR for group 4

(3) Remove blanking plate located on dual pressure reducing shut-off valve upstream duct and install adapter in its place.

(4) Arrange the test equipment described above.

C. Test

(1) Open compressed air or nitrogen supply unit and pressurize to 14 bars (203.04 psi). Using a foarming non-corrosive product, check for leakage at level of clamp attaching engine bleed duct to check valve and at level of dual pressure reducing shut-off valve attachment clamp.

(2) Permissible leaks

The maximum permissible leak is 1.5 bar (21.75 psi) per minute when air pressure is 14 bars (203.04 psi). (The pressure leak of 1.5 bar is obtained by adding internal leaks from engine air bleed duct check valve, dual pressure reducing shut-off valve and seals).

D. Close-Up

(1) Shut down compressed air or nitrogen supply unit.

(2) Open air vent valve.

(3) Disconnect test equipment.

(4) Remove adapter.

(5) Install blanking plate on dual pressure reducing shut-off valve upstream duct.

3. Functional Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Ground Air Supply Unit - Relative minimum pressure : 2 bars (or 30 psi) Airflow : 0.4 kg/sec (or 0.88 lbs. in.) - Relative maximum pressure : 4 bars (or 65 psi) Airflow 0.6 Kg/sec (or 1.32 lb./sec) - The Temperature must not exceed 300°C	
Coupling Equipment, Ground Air Supply Unit	D921603000

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Ground Service Telephone	

B. Prepare

(1) Check that the collector tank on engine to be tested contains at least 2500 kg of fuel.

(2) On air bleed duct (upstream of the pressure reducing shut-off valve) loosen and remove test connector blanking plug.

(3) Install coupling equipment D921603000 on the air duct, upstream of pressure reducing and shut-off valve. Connect the ground air supply unit to the coupling equipment.

(4) Connect the electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(5) Check, according to the air conditioning group to be tested, that the following circuit breakers are set :

(a) Group 1

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 AIR COND VALVE CLOSE & AIR GEN IND	1-213	1H 612	D11
FLT DECK TEMP IND		1D 161	E10
GRP1 CAU/DUCT TEMP IND		1D 162	E11
GRP1 TEMP SELECTOR MANL SUP & CONT		H 991	F11
ENG1 B/VALVE CONT & OVER PRESS IND		1H 611	D10
GRP1 AIR COND VALVE EMER CLOSE SUP		1H 667	F13
GRP1 AIR GEN CONT & IND		1H 862	D13
ENG1 C/BLEED VALVE CONT		1H 861	D12
GR1 ENTRY SAFETY VALVE SUP		1H 680	E12
TANK 1 MAIN PUMP SUP		1Q 834	J 3

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NOSE UC WEIGHT SW "A" SYS SUP		G 291	M16
LH UC WEIGHT SW "A" SYS SUP		G 292	M17
GRP1 TEMP SELECTOR AUTO SUP & CONT	2-213	H1000	B17
GRP1 SAMPLING DUCT FAN SUP		H1004	B16
GRP1 FUEL VALVE CONT		1H 863	D16
TANK 1 & 2 FQI SUP		Q1360	A23
ENG1 CROSS FEED VALVE SUP & IND	3-213	1Q 41	B 5
TANK1 STBY 1 PUMP SUP	4-213	1Q 835	F 5
GRP1 TEMP VALVE POSN IND	13-215	H1007	E 1
ENG1 CHARGE AIR PRESS IND		1H 864	D 2
GRP1 ICE DETECTOR SENSOR SUP	15-215	H 995	D 4
FUEL TEMP IND		D 1	B25
TANK 1 LP VALVE POSN IND		1Q 3	C21
ENG1 BYPASS VALVE SLP & IND		1Q 762	F24
ENG1 ACCUM IND & BYPASS VALVE CONT		1Q 761	F22
TANK 1 MAIN PUMP IND	15-216	1Q 831	B 1
ENG 1 LP VALVE SUP 1		1Q 1	C 1
TANK 1 STBY 1 PUMP IND		1Q 332	B 2

(b) Group 2

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP2 AIR COND VALVE CLOSE & AIR GEN IND	5-213	2H 612	A 9
FWD CABIN TEMP IND		2D 161	D 8
GRP2 CAU/DUCT TEMP IND		2D 162	D 9
GRP2 TEMP SELECTOR AUTO		H 992	B 8

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SUP & CONT			
ENG3 B/VALVE CONT & OVER PRESS		2H 611	A 8
GRP2 AIR COND VALVE		2H 667	A10
GRP2 AIR GEN CONT & IND		2H 862	F 9
ENG2 C/BLEED VALVE CONT		2H 861	F 8
GRP2 ENTRY SAFETY VALVE SUP		2H 680	E10
GRP2 TEMP SELECTOR AUTO SUP & CONT	4-213	H1001	E11
GRP2 SAMPLING DUCT FAN SUP		H1005	D12
GRP2 FUEL VALVE CONT		2H 863	E12
TANK2 STBY 1 PUMP SUP		2Q 835	B 5
ENG2 CROSS FEED VALVE SUP & IND	1-213	2Q 41	K11
TANK 2 MAIN PUMP SUP		2Q 834	L 3
NOSE UC WEIGHT SW "A" SYS SUP		G 291	M16
LH UC WEIGHT SW "A" SYS SUP		G 292	M17
GRP2 TEMP VALVE POSN IND	13-215	H1008	E 2
ENG2 CHARGE AIR PRESS IND	13-216	2H 864	B20
GRP2 ICE DETECTOR SENSOR SUP	15-215	H 996	D24
ENG2 LP VALVE POSN IND		2Q 3	C 3
ENG2 BYPASS VALVE SUP & IND		2Q 762	E 5
ENG2 ACCUM IND & BYPASS VALVE CONT		2Q 761	E 3
TANK2 MAIN PUMP IND	15-215	2Q 831	B19
FUEL TANK IND		D 1	B25
TANK 2 STBY 1 PUMP IND		2Q 832	B20
TANK 1 & 2 FQI SUP	2-213	Q1360	A23

(c) Group 3

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
TANK3 MAIN PUMP SUP	1-213	3Q 834	N 3
ENG3 CROSS FEED VALVE SUP & IND		3Q 41	K12
NOSE UC WEIGHT SW "A" SYS SUP		G 291	M16
LH UC WEIGHT SW "A" SYS SUP		G 292	M17
GRP3 TEMP SELECTOR AUTO SUP & CONT	2-213	H1002	G16
GRP3 FUEL VALVE CONT		3H 863	F16
ENG3 LP VALVE SUP 1	3-213	3Q 1	A 6
TANK3 STBY 1 PUMP SUP	4-213	3Q 835	A 8
TANKS 3 & $ FQI SUP		Q1354	C 1
ENG3 CHARGE AIR PRESS IND	13-215	3H 864	F 3
GRP3 AIR COND VALVE CLOSE & AIR GEN IND	15-215	3H 612	A 3
REAR CABIN TEMP IND		3D 161	C 3
GRP3 CAU/DUCT TEMP IND		3D 162	C 4
GRP3 TEMP SELECTOR MANL SUP & CONT		H 993	D 3
GRP3 ICE DETECTOR SENSOR		H 997	E 4
ENG3 B/VALVE CONT & OVER PRESS IND		3H 611	A 4
GRP3 AIR COND VALVE EMER CLOSE SUP		3H 667	F 2
GRP3 AIR GEN CONT & IND		3H 862	B 3
ENG3 C/BLEED VALVE CONT		3H 861	B 4
GRP3 FUSELAGE ENTRY SAFETY VALVE SUP		3H 680	F 3
FUEL TANK IND		D 1	B25
ENG3 BYPASS VALVE SUP & IND		3Q 762	F25
ENG3 ACCUM IND & BYPASS VALVE CONT		3Q 761	F23
TANK3 MAIN PUMP IND	15-216	3Q 831	B 4
ENG3 LP VALVE POSN IND		3Q 3	C 4
TANKK3 STBY 1 PUMP IND		3Q 832	B 5
GRP3 TEMP VALVE POSN IND	13-216	H1009	C19

(d) Group 4

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
TANK4 MAIN PUMP SUP	1-213	4Q 834	Q 3
NOSE UC WEIGHT SW "A" SYS SUP		G 291	M16
LH UC WEIGHT SW "A" SYS SUP		G 292	M17
ENG2 LP VALVE SUP1	3-213	2Q 1	A 5
GRP4 TEMP SELECTOR AUTO SUP & CONT	4-213	H1003	B12
GRP4 FUEL VALVE CONT		4H 863	B11
TANK4 STBY 1 PUMP SUP		4Q 835	F 8
TANKS 3 & 4 FQI SUP		Q1354	C 1
GRPS 3 & 4 COMPTR CONT		H1006	C12
ENG4 CHARGE AIR PRESS IND	13-216	4H 864	B21
GRP4 AIR COND VALVE CLOSE & AIR GEN IND	15-216	4H 612	A24
GRP4 CAU/DUCT TEMP IND		4D 162	C23
GRP4 TEMP SELECTOR MANL SUP & CONT		H 994	C24
GRP4 ICE DETECTOR SENSOR SUP		H 998	E23
ENG4 B/VALVE CONT & OVER PRESS IND		4H 611	A23
GRP4 AIR COND VALVE EMER CLOSE SUP		4H 667	F26
GRP4 AIR GEN CONT & IND		4H 862	B23
ENG4 C/BLEED VALVE CONT		4H 861	B24
GRP4 FUSELAGE ENTRY SAFETY VALVE SUP		4H 680	F25
ENG4 LP VALVE SUP 1		4Q 1	C 2
ENG4 BYPASS VALVE SUP & IND		4Q 762	E 6
ENG4 ACCUM IND & BYPASS VALVE CONT		4Q 761	E 4
TANK4 MAIN PUMP IND	15-215	4Q 831	B22
TANK4 LP VALVE POSN IND		4Q 3	C22
TANK4 STBY 1 PUMP IND		4Q 832	B23
FUEL TANK IND		D 1	B25
GRP4 TEMP VALVE POSN	13-216	H1010	D19

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
IND			
TEMP COMPTR IND GRP SELECT MI SUP	5-213	H 999	B 9

(6) Check that the fire control handle is in NORMAL position.

(7) On panel 2-214
- Place BLEED VALVES switches in OPEN position
- Place CROSS BLEED switches in SHUT position

  Check that :
- COND VALVE switch is in OFF position
- Temperature selector is in COLD position
- All tank inlet valves are in the normal SHUT position
- HYD/COND, FUEL, EXCH, BYPASS switches are in the normal ARMED position.

Check the fuel throttle valve OPEN and SHUT positions on FUEL VALVE magnetic indicator by means of FUEL VALVE switch. Time delay. Then return the switch to AUTO position.

(8) It is required that an observer be under the nacelle, in contact with the flight compartment by telephone. Check that changeover valve blanking cap is removed.

CAUTION I : BEFORE STARTING THE TEST, MAKE CERTAIN THAT THE AIR START VALVES IN THE ENGINE ZONE ARE CLOSED BY CHECKING THE POINTER, THE MANUAL CONTROL OF WHICH MUST BE IN THE HORIZONTAL "SHUT" POSITION.

CHECK THE BOOSTRAP FOR FULL OIL LEVEL. CHECK THAT DUAL PRESSURE REDUCING SHUT-OFF VALVES, AIR CONDITIONING VALVES, FUEL CONTROL VALVES AND PRIMARY HEAT EXCHANGER RAM AIR CONTROL VALVES ARE NOT MANUALLY SHUT.

CAUTION II : DECREASE PRESSURE IN GROUND AIR SUPPLY UNIT TO 1.72 BARS (25PSI) FOR DUCT TEST AND FOR ENGINE SHUT DOWN TEST BY FIRE CONTROL HANDLE.

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C. Test

(1) Pressurize Fuel System

WARNING : OBSERVE FUEL SYSTEM SAFETY PRECAUTIONS DESCRIBED IN 28-00-00 AND 28-10-00.

NOTE : Pressurization assumes a minimum quantity of fuel of 2500 kg in the appropriate feed tank (1, 2, 3, 4).
On centre console, place throttle control levers in SHUT position (lower mechanical stop).
Check that crossfeed valves are closed and that associated magnetic indicators display vertical stripes.
With the LP VALVE switch locked in OPEN position by the switch guard, check that the associated magnetic indicator shows an in-line indication.
Place the first of the three ENGINE FEED PUMPS control switches in ON position (MAIN PUMP).
Engine 1 Main Fuel Pump for group 1
Engine 2 Main Fuel Pump for group 2
Engine 3 Main Fuel Pump for group 3
Engine 4 Main Fuel Pump for group 4
Check that the corresponding LOW PRESS indicator light goes off when pump operating pressure is reached.

WARNING : FUEL SYSTEM MUST NOT OPERATE MORE THAN 2 HOURS.

In case Fuel System cannot be used.

Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
For GRP 1 LH.UC WEIGHT SW A SYS SUP	1-213	G 292	M17
For GRP 2 LH.UC WEIGHT SW B SYS SUP	3-213	G 293	B 8
For GRP 3 RH.UC WEIGHT SW B SYS SUP	3-213	G 294	B 9
For GRP 4 RH.UC WEIGHT SW A SYS SUP	1-213	G 295	M18

WARNING : DURING TEST, FUEL EXCH WARNING LIGHT MAY COME ON. ON PANEL 2-214 PLACE FUEL VALVE SWITCH IN OPEN POSITION (SELF-HOLDING CANCELLATION).

(2) On panel 2-214, place temperature control selector in AUTO 2/3 position.

(3) Start up the ground air supply unit.

(4) On panel 2-214

(a) Place BLEED VALVE switch in OPEN position. On magnetic indicator, check that the corresponding valve opens. Check that pressure increases on air pressure indicator.

(b) Place COND VALVE switch in ON position. Check on COND VALVE magnetic indicator that the air conditioning valve is open.

NOTE : If SMOKE and AIR warning lights shut down the group, make certain that the air conditioning valve is closed, place AIR GENERATION test selector switch on panel 28-214 in INHIB position, then open the group.

(c) Check on JET PUMP magnetic indicator that ejector control valve is in open position.

(d) Place COND VALVE switch in BOOST position.

(e) Check that airflow increases on MASS FLOW indicator.

NOTE : Disregard the operation of the RAM AIR magnetic indicator on panel 2-214.

- The ram air control valve is open when the cooling air temperature is greater than or equal to 25°C or when the conditioning air temperature -detected upstream of CAU compressor- is greater than or equal to 100°C.

(5) Place COND VALVE switch in ON position.

(6) Place COND VALVE switch in OFF position

- COND VALVE magnetic indicator displays a horizontal

stripe
- JET PUMP magnetic indicator displays a vertical stripe
(No pressure in the ejector control valve).
- MASS FLOW indicator drops to zero.

(7) On panel 2-214

(a) Operate COND VALVE switch several times, then leave it in ON position.

(b) Operate CROSS BLEED switch several times then leave it in SHUT position.
Check that the associated magnetic indicator operates correctly.

(8) Check the temperature control function.

On panel 4-122, make certain that the following switches are in ON position :
Group 1 (H1062) ; Group 2 (H1061) ; Group 3 or 4 (H1063).

(a) In AUTO position
On DUCT T° IND indicator (located above MASS FLOW indicator on panel 2-214) note the resulting indication changes according to the various positions selected on the temperature selector.
On panel 2-214, check the temperature control valve position indicator for correct operation.
Indication changes are slow to appear.

(b) In STANDBY position
The same as in AUTO but the indication changes are more rapid.

(9) On panel 2-214

(a) Place BLEED VALVES switch in SHUT position.

(b) Check that associated magnetic indicator changes instantaneously in the horizontal position (valve closed).

(c) Check that pressure on pressure indicator drops
The air conditioning valve can close, and the COND VALVE magnetic indicator can be either "striped" or in horizontal position.

(10) Return BLEED VALVES switch to OPEN position, and check :

(a) That associated magnetic indicator changes immediately to vertical position.

(b) COND VALVE magnetic indicator changes to vertical position.

(11) Warnings check :

(a) On panel 2-214, press O/PRESS warning light

- The light must come on
- On panel 4-211, AIR warning light must come on (after a 2 second delay)
- The single stroke gong sounds

- On panel 2-214, BLEED VALVES magnetic indicator changes to horizontal position (valve takes 2 seconds to close).

NOTE : Before releasing the warning light wait until the dual pressure reducing shut-off valve and the air conditioning valve are closed.

CAUTION : ONLY RESET THE CIRCUIT BREAKERS APPROPRIATE TO THE ENGINE TO BE CHECKED (REFER TO WARNINGS SUMMARY TABLE).

(b) On panel 2-214, place CROSS BLEED switch in positions 1 and 2 for engines 1 or 2, and in positions 3 and 4, for engines 3 or 4.

- The two CROSS BLEED magnetic indicators change to horizontal position.
- Press DUCT warning light ; it must come on (5 ± 2 seconds).
- The dual pressure reducing shut-off valve closes. The BLEED VALVES magnetic indicator changes to horizontal. The CROSS BLEED magnetic indicators (1 and 2) or (3 and 4), according to the group being tested, change to vertical position.
  On panel 4-211, AIR warning light must come on.
  The single stroke gong sounds.
  When DUCT press-to-test warning light is
R released, AIR warning light goes off and the
R gong stops immediately. DUCT warning light goes
R off after 5 second delay approximately (cabin
R isolation valve opening time).
- The dual pressure reducing shut-off valve opens, BLEED VALVE magnetic indicator changes

to vertical, and CROSS BLEED magnetic indicators change to horizontal position.
- Bring back CROSS BLEED switches to SHUT position.
  CROSS BLEED magnetic indicators return to vertical.

(c) Control of warnings
Check that :
- On panel 4-122, the following switches are in the configuration indicated (in accordance with the engine installed) :

  BLEED VALVES in OPEN position
  CROSS BLEED in SHUT position
  COND VALVE in ON position
  FUEL VALVE in OPEN position.
- On panel 23-214, AIR COND TEST rotary test switch is in OFF position,
- On panel 2-214, the following indicators are in the configuration indicated below.

  Magnetic indicators :
  BLEED VALVES in vertical position
  CROSS BLEED in vertical position
  COND VALVE in vertical position
  JET PUMP in horizontal position
  FUEL VALVE in horizontal position

  warning lights :

OVER PRESS)	
PRIM EXCH)	
SEC EXCH)	
FUEL EXCH)	All extinguished
DUCT)	
LEAK)	
SMOKE)	

- On panel 23-214, place AIR COND TEST switch in TEST position
  No change occurs.

(12) Engine 1 warnings test

The tests are carried out with AIR COND TEST rotary test switch located on Flight Engineer's panel 23-214; during test the associated AIR COND TEST switch must be in TEST position.

Place the rotary test switch successively in the positions indicated below, and check the warning lights

on Flight Engineer's panel :

(a) PRIM position :

- PRIM EXCH warning light must come on
- AIR warning light must come on on panel 4-211
- Single stroke gong sounds.

Position after PRIM :

- PRIM EXCH and AIR warning lights go off
- Single stroke gong stops.

(b) SEC position :

- SEC EXCH warning light must come on

Position after SEC :

- SEC EXCH warning light goes off

(c) FUEL position :

- FUEL EXCH warning light must come on

Position after FUEL :

- FUEL EXCH warning light goes off

(d) DUCT 1 position :

- DUCT warning light must come on

Position after DUCT 1 :

- DUCT warning light goes off

(e) Position DUCT 2 :

- DUCT warning light must come on

Position after DUCT 2 :

- DUCT warning light goes off

(f) Select OFF, then COND1 position :

- Check that air conditioning valve closes.
- COND VALVE magnetic indicator changes to horizontal position,
- MASS FLOW indicator displayed value decreases

down to zero

(g) Return to OFF position :

- Check that the group opens.

(h) FLOW 1 position :

- On MASS FLOW indicator, check that flow drops to zero (mass flow control valve shut),
- Air conditioning valve remains open (COND VALVE magnetic indicator remains vertical).

(i) Place AIR COND TEST switch and rotary test switch in OFF position

- On panel 2-214, place both CROSS BLEED 1 and 2 switches in open position,

  NOTE : Ref. CAUTION II Paragraph 2B (8).

- Both CROSS BLEED magnetic indicators change to horizontal position,
- Check by pulling fire control handle, that dual pressure reducing shut-off valve closes, followed by the group,
- BLEED VALVES magnetic indicator changes to horizontal position,
- Both CROSS BLEED magnetic indicators change to vertical position,
- Return fire control handle to NORMAL position,
- Pressure reducing shut-off valve opens,
- BLEED VALVES magnetic indicator returns to the vertical position,
- CROSS BLEED magnetic indicators return to horizontal position,
- DUCT warning light must come on during 5 ± 2 seconds,
- Place both CROSS BLEED switches in SHUT position,
- Both CROSS BLEED magnetic indicators change to vertical position.

(13) Engine 2 warnings test

The tests are carried out with AIR COND TEST rotary test switch located on Flight Engineer's panel 23-214 ; the associated AIR COND TEST switch must be in TEST position.

Place the rotary test switch successively in the

positions indicated below, and check the warning lights on Flight Engineer's panel :

(a) PRIM position :

- PRIM EXCH warning light must come on

Position after PRIM :

- PRIM EXCH warning light must come on

(b) SEC position :

- SEC EXCH warning light must come on
- On panel 4-211, AIR warning light must also come on
- Single stroke gong sounds.

Position after SEC :

- SEC EXCH warning light and AIR warning light go off
- Single stroke gong stops

(c) FUEL position :

- FUEL EXCH warning light must come on

Position after FUEL :

- FUEL EXCH warning light goes off

(d) DUCT 1 position :

- DUCT warning light must come on

Position after DUCT 1 :

- DUCT warning light goes off

(e) Position DUCT 2 :

- DUCT warning light must come on

Position after DUCT 2 :

- DUCT warning light goes off

(f) Select OFF, then COND 2 position :

- Check that air conditioning valves closes,

- COND VALVE magnetic indicator changes to horizontal position,
- MASS FLOW indicator reading decreases down to zero

(g) Return to OFF position :

- Check that the group opens.

(h) FLOW 2 position :

- On MASS FLOW indicator, check that flow decreases down to zero (mass flow control valve shuts)
- Air conditioning valve remains open (COND VALVE magnetic indicator remains vertical).

(i) Place AIR COND TEST rotary test switch and switch in OFF position.

- On panel 2-214, place both CROSS BLEED 1 and 2 switches in open position

NOTE : Ref. CAUTION II Paragraph 2B (8).

- Both CROSS BLEED magnetic indicators change to horizontal position
- Check by pulling fire control handle that dual pressure reducing shut-off valve closes followed by the group
- BLEED VALVES magnetic indicator changes to horizontal position.
- Both CROSS BLEED magnetic indicators change to vertical position
- Return fire control handle to NORMAL position
- Pressure reducing shut-off valve opens
- BLEED VALVES magnetic indicator returns to the vertical position
- CROSS BLEED magnetic indicators return to horizontal position
- DUCT warning light must illuminate during 5 ± 2 seconds
- Place both CROSS BLEED switches in SHUT position
- Both CROSS BLEED magnetic indicators change to vertical position.

(14) Engine 3 warnings test

The tests are carried out with AIR COND TEST rotary test switch located on Flight Engineer's panel 23-214 ;

the associated AIR COND TEST switch must be in TEST position.

Place the rotary test switch successively in the positions indicated below, and check the warning lights on Flight Engineer's panel 2-214 :

(a) PRIM position :

- PRIM EXCH warning light must come on

Position after PRIM :

- PRIM EXCH warning light goes off

(b) SEC position :

- SEC EXCH warning light must come on

Position after SEC :

- SEC EXCH warning light goes off

(c) FUEL position :

FUEL EXCH warning light must come on

Position after FUEL :

FUEL EXCH warning light goes off

(d) DUCT 1 position :

- DUCT warning light must come on
- On panel 4-211, AIR warning light must also come on
- Single stroke gong sounds.

Position after DUCT 1 :

- DUCT warning light and AIR warning light go off
- Single stroke gong ceases.

(e) Position DUCT 2 :

- DUCT warning light must come on

Position after DUCT 2 :

- DUCT warning light goes off

(f) Select OFF, then COND 3 position :

- Check that the air conditioning valve closes
- COND VALVE magnetic indicator changes to horizontal position
- MASS FLOW indicator is at zero.

(g) Return to OFF position :

- Check that the group opens

(h) FLOW 3 position :

- On MASS FLOW indicator, check that flow decreases down to zero (mass flow control valve shut)
- The air conditioning valve remains open.

(i) Place AIR COND TEST switch and rotary test switch in OFF position.

- On panel 2-214, place both CROSS BLEED switches 3 and 4 in open position.

  NOTE : Ref. CAUTION II paragraph 2B (8).

- The two CROSS BLEED magnetic indicators change to horizontal position.
- Check, by operating fire control handle, that dual pressure reducing shut-off valve closes, followed by the group.
- BLEED VALVES magnetic indicator changes to horizontal position
- Both CROSS BLEED magnetic indicators change to vertical position.
- Return fire control handle to NORMAL position
- Pressure reducing shut-off valve opens
- BLEED VALVES magnetic indicator returns to the vertical position
- CROSS BLEED magnetic indicators return to horizontal position
- DUCT warning light must come on during 5 ± 2 seconds
- Place both CROSS BLEED switches in SHUT position.
- Both CROSS BLEED magnetic indicators change to vertical position

(15) Engine 4 Warnings Test

The tests are carried out with AIR COND TEST rotary test switch, located on Flight Engineer's panel 23-214;

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the associated AIR COND TEST switch must be in TEST position.

Place the rotary test switch successively in the positions indicated below and check the warning lights on Flight Engineer's panel 2-214 :

(a) PRIM position :

- PRIM EXCH warning light must come on

Position after PRIM :
- PRIM EXCH warning light goes off

(b) SEC position :
- SEC EXCH warning light must go off

Position after SEC :
SEC EXCH warning light goes off

(c) FUEL position :

FUEL EXCH warning light must come on

Position after FUEL :
FUEL EXCH warning light goes off

(d) DUCT 1 position :
DUCT warning light must come on

Position after DUCT 1 :
DUCT warning light goes off

(e) Position DUCT 2 :

DUCT warning light must come on
- On panel 4.211 AIR warning light must also come on
- Single stroke gong sounds

Position after DUCT 2 :
- DUCT and AIR warning lights go off
- Single stroke gong stops

(f) Select OFF, then COND 4 position :

- Check that the air conditioning valve closes
- COND VALVE magnetic indicator changes to horizontal position
- MASS FLOW indicator is in zero position

(g) Return to OFF position :
- Check that the group opens

(h) FLOW 4 position :

- On MASS FLOW indicator, check that flow decreases down to zero (mass flow control valve closed.
- Air conditioning valve remains open.

(i) Place AIR COND TEST switch and rotary test switch in OFF position

- On panel 2-214 place both CROSS BLEED 3 and 4 switches in open position

  NOTE : Ref. CAUTION II Paragraph 2B (8)

- Both CROSS BLEED magnetic indicators change to horizontal position
- Check, by pulling fire control handle, that dual pressure reducing shut-off valve closes, followed by the group.
- BLEED VALVE magnetic indicator changes to horizontal position
- Both CROSS BLEED magnetic indicators change to vertical position
- Return fire control handle to NORMAL position
- Pressure reducing shut-off valve opens.
- BLEED VALVES magnetic indicator returns to the vertical position.
- CROSS BLEED magnetic indicators return to horizontal position
- DUCT warning light must come on during 5 ± 2 seconds
- Place both CROSS BLEED switches in SHUT position
- Both CROSS BLEED magnetic indicators change to vertical position

Table of AIR COND TEST rotary test switch operation on Flight Engineer's panel 23-214.

SUMMARY TABLE

WARNING	PRIM EXCH	warning light on 2-214)
	SEC EXCH	warning light on 2-214)
	AIR	warning light on 4-211)+GONG
	DUCT	warning light on 2-214)
	FUEL EXCH	warning light on 2-214

Rotary test switch position on 23-214	ENGINE 1	ENGINE 2	ENGINE 3	ENGINE 4
OFF	EXTINGUISHED			
PRIM EXCH	PRIM EXCH AIR GONG	PRIM EXCH	PRIM EXCH	PRIM EXCH
SEC EXCH	SEC EXCH	SEC EXCH AIR GONG	SEC EXCH	SEC EXCH
FUEL EXCH	FUEL EXCH	FUEL EXCH	FUEL EXCH	FUEL EXCH
DUCT 1	DUCT	DUCT	DUCT AIR GONG	DUCT
DUCT 2	DUCT	DUCT	DUCT	DUCT AIR GONG

(16) Test of smoke detection and air conditioning warnings.

These tests are effected using the AIR GENERATION rotary switch on Flight Engineer's panel 28-214.

Place the rotary switch successively in the positions detailed below, and check the warning lights on Flight Engineer's panel 28-214.

On panel 2-214, check that the 4 COND VALVE switches are in ON position, and that COND VALVE magnetic indicator of the group under pressure is in vertical position.

Move AIR GENERATION rotary switch from NORM to MW GR4 position.

- There is no resulting function. Place AIR GENERATION rotary switch in TEST position.
  The four SMOKE warning lights, as well as the AIR warning light, on panel 4-211, come on. Single stroke gong sounds.
  Check that AIR warning light goes off on panel 4-211 when the 4 COND VALVE switches are placed in OFF position, and then comes on again when a single switch is placed in ON or BOOST position (return the 4 COND VALVE switches to ON).
  Place the rotary switch in MW GR4 position.
- SMOKE warning light on panel 4-211 comes on, single stroke gong sounds.
  Place rotary switch in OFF GR4 position
  SMOKE 4 warning light goes off, SMOKE warning light goes off on panel 4-211.
  Place rotary switch in MW GR3 position
  On panel 4-211, SMOKE warning light comes on, single stroke gong sounds
  Place rotary switch in OFF GR3 position
- SMOKE 3 warning light goes off SMOKE warning light goes off on panel 4-211
  Place rotary switch in MW GR2 position
- On panel 4-211, SMOKE warning light comes on, single stroke gong sounds
  Place rotary switch in OFF GR 2 position
- SMOKE 2 warning light goes off SMOKE warning light also goes off on panel 4-211
  Place rotary switch in MW GR1 position
- SMOKE warning light comes on on panel 4-211 ; single stroke gong sounds
  Place rotary switch in OFF GR1 position
- SMOKE 1 warning light goes off ; SMOKE and AIR warning lights go off on panel 4-211
  Place rotary switch successively in NORM, INHIB and FAULT position
- The 4 FAULT warning lights come on.
  Place rotary switch in INHIB position
  The 4 FAULT warning lights go off
  Place rotary switch in NORM position.

D. Close-Up

(1) Place COND VALVE switch in OFF position.

(2) Place BLEED VALVES switch in SHUT position.

(3) Shut down ground air supply unit.

(4) In case the Fuel system has been pressurized :

Place ENGINE FEED PUMP switch in OFF position. After a few seconds the corresponding LOW PRESS caption light must come on.

If necessary, remove safety clip and tag and reset the circuit breaker tripped in paragraph 2.C.(1).
If FUEL EXCH warning light has come on during test after switching off the air supply unit, wait for cancellation of warning and place FUEL VALVE switch in AUTO position.

(5) Disconnect ground air supply unit.

(6) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(7) Remove air supply unit coupling equipment.

(8) Replace blanking plug on air bleed duct test connector.

(9) Disconnect ground service telephone.

END OF THIS SECTION

NEXT

COMPRESSION - DESCRIPTION AND OPERATION

1. General (Ref. Fig.001 and 002)

   A. Conditioning air is supplied through four air conditioning units. Each unit is associated with one engine.

      (1) Pressurized conditioned air is supplied to flight compartment through engine 1 air conditioning unit.

      (2) Pressurized conditioned air is supplied to forward cabin through engine 2 air conditioning unit.

      (3) Pressurized conditioned air is supplied to aft cabin through engines 3 and 4 air conditioning units which are interconnected.

      (4) Each air conditioning unit is of the "bootstrap" air cycling type, with cooling via ram air and fuel provided in an intermediate cooling system.

      (5) On the ground, conditioned air is supplied by a ground air conditioning unit.

   B. Each unit consists of :

      (1) An assembly limiting the pressure and outflow of engine bleed air.

      (2) An assembly limiting the air temperature.

      (3) An exchanger cooling assembly.

      (4) A crossbleed system.

      (5) A water extraction and recovery system.

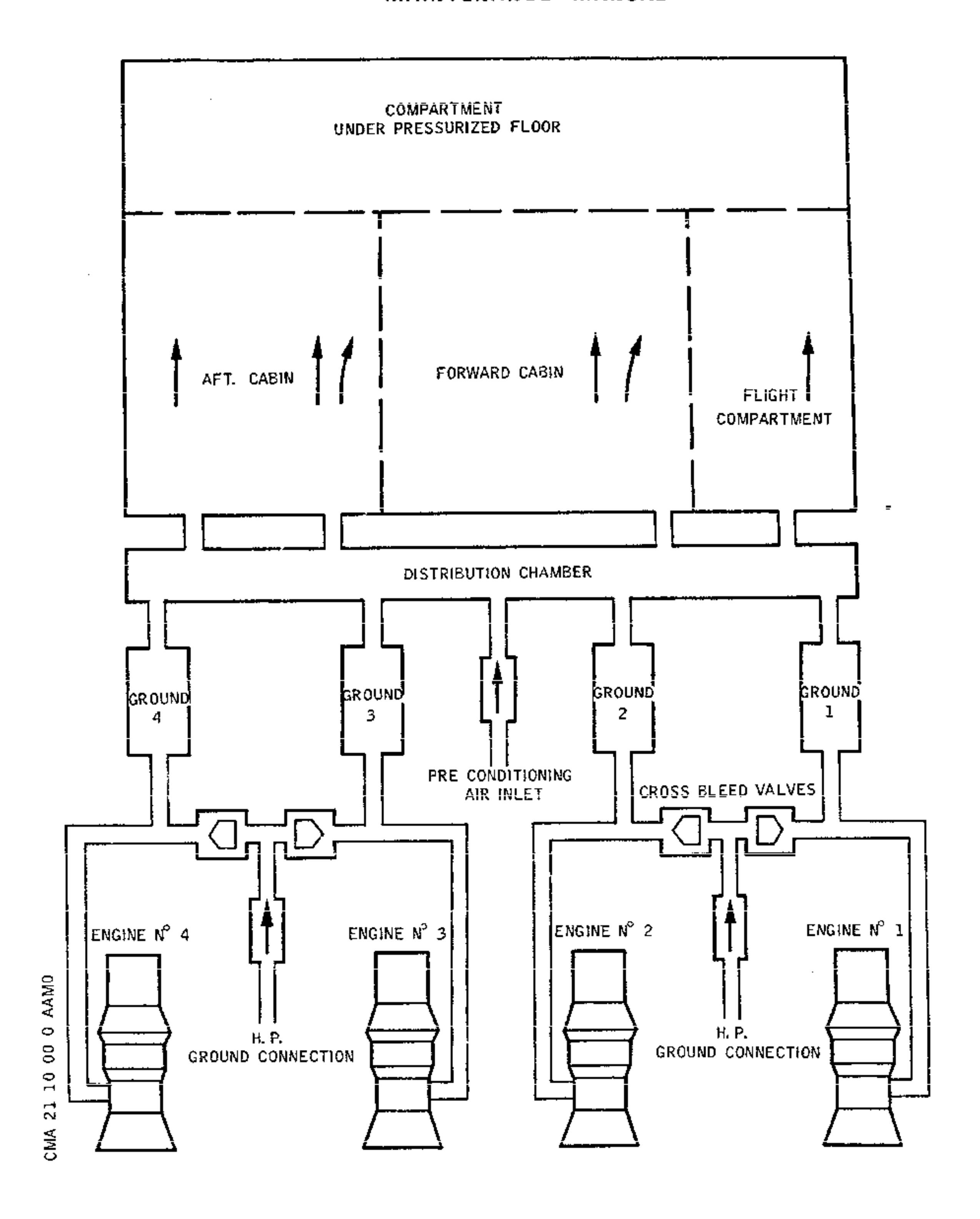
      (6) Auxiliary accessories.

      (7) A smoke detection unit.

      NOTE : As the four units are identical, only one unit will be described.

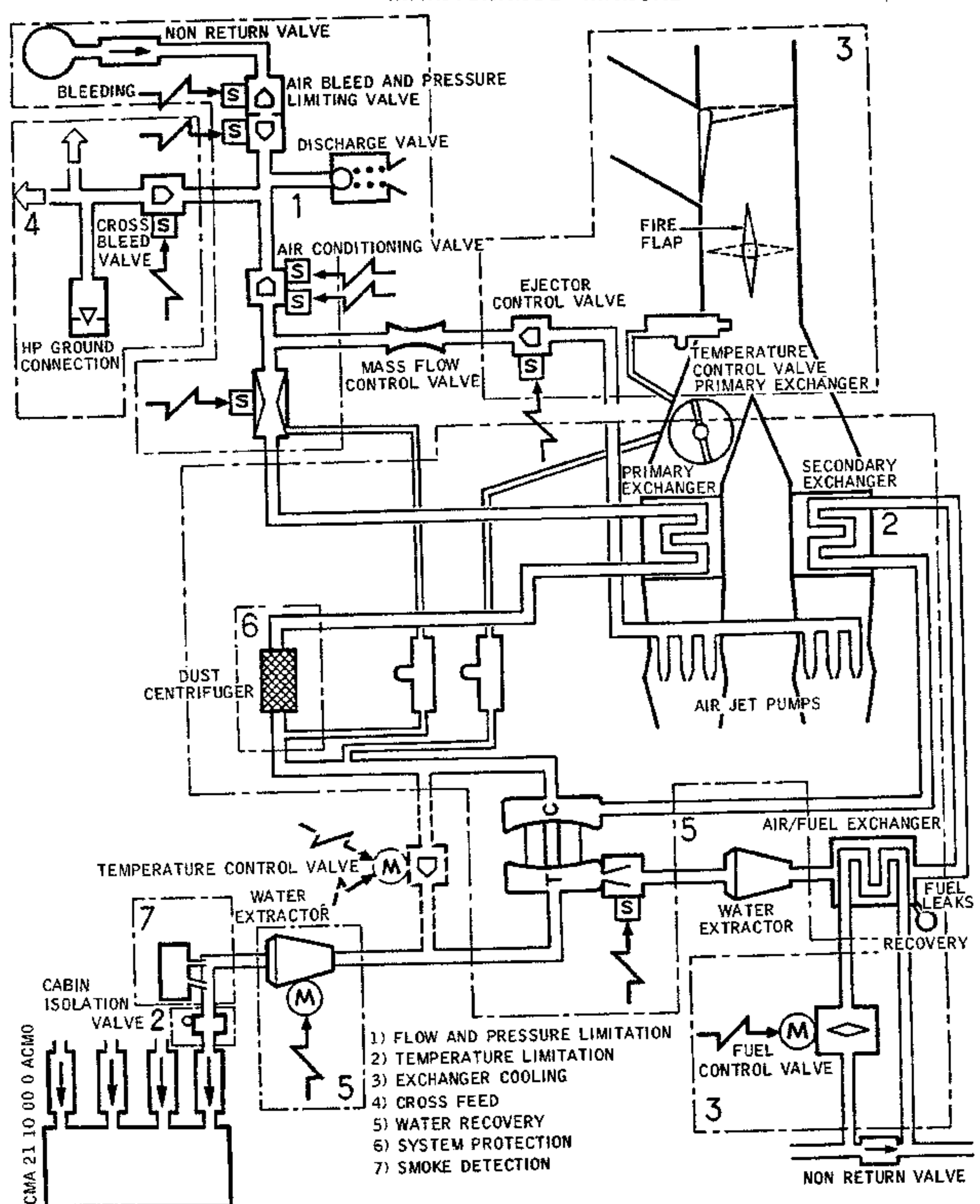
R 2. Electrical Power Supply

R The compression system control circuit is supplied with
R essential bars. Detailed information on these bars and panel
R identification are listed in table below :



R

Compression
Figure 001



Description of an Air Conditioning Group
Figure 002

R

CIRCUIT BREAKER	BAR	PANEL	POSITION	SERVICE
G 292	3P	1-213	M17	LH UC WEIGHT SW "A" SYS SUP
G 293	4P	3-213	B 8	LH UC WEIGHT SW "B" SYS SUP
G 294	4P	3-213	B 9	RH UC WEIGHT SW "B" SYS SUP
G 295	3P	1-213	M18	RH UC WEIGHT SW "A" SYS SUP
H 995	1P	15-215	D 4	GRP1 ICE Detector Sensor SUP
H 996	2P	15-216	D24	GRP2 ICE Detector Sensor SUP
H 997	1P	15-215	E 4	GRP3 ICE Detector Sensor SUP
H 998	2P	15-216	E23	GRP4 ICE Detector Sensor SUP
1H 611	3P	1-213	D10	ENG1 B/Valve Cont and over Press ind.
2H 611	4P	5-213	A 8	ENG2 B/Valve Cont and over Press ind.
3H 611	1P	15-215	A 4	ENG3 B/Valve Cont and over Press ind.
4H 611	2P	15-216	A23	ENG4 B/Valve Cont and over Press ind.
1H 612	3P	1-213	D11	GRP1 AIR COND VALVE CLOSE and AIR GEN IND.
2H 612	4P	5-213	A 9	GRP2 AIR COND VALVE CLOSE and AIR GEN COND.
3H 612	1P	15-215	A 3	GRP3 AIR COND VALVE CLOSE and AIR GEN COND.
4H 612	2P	15-216	A24	GRP4 AIR COND VALVE CLOSE and AIR GEN COND.
1H 667	3P	1-213	F13	GRP1 AIR COND VALVE EMER CLOSE SUP
2H 667	4P	5-213	A10	GRP2 AIR COND VALVE EMER CLOSE SUP
3H 667	1P	15-215	F 2	GRP3 AIR COND VALVE EMER CLOSE SUP
4H 667	2P	15-216	F26	GRP4 AIR COND VALVE EMER CLOSE SUP
1H 680	3P	1-213	E12	GRP1 ENTRY SAFETY VALVE SUP
2H 680	4P	5-213	E10	GRP2 ENTRY SAFETY VALVE SUP
3H 680	1P	15-215	F 3	GRP3 ENTRY SAFETY VALVE SUP

CIRCUIT BREAKER	BAR	PANEL	POSITION	SERVICE
4H 680	2P	15-216	F25	GRP4 ENTRY SAFETY VALVE SUP
1H 861	3P	1-213	D12	ENG1 C/BLEED VALVE CONT
2H 861	4P	5-213	F 8	ENG2 C/BLEED VALVE CONT
3H 861	1P	15-215	B 4	ENG3 C/BLEED VALVE CONT
4H 861	2P	15-216	B24	ENG4 C/BLEED VALVE CONT
1H 862	3P	1-213	D13	GRP1 AIR GEN CONT and IND
2H 862	4P	5-213	F 9	GRP2 AIR GEN CONT and IND
3H 862	1P	15-215	B 3	GRP3 AIR GEN CONT and IND
4H 862	2P	15-216	B23	GRP4 AIR GEN CONT and IND
1H 863	5XQA	2-213	D16	GRP1 Fuel valve CONT
2H 863	8XQC	4-213	E12	GRP2 Fuel valve CONT
3H 863	6XQC	2-213	F16	GRP3 Fuel valve CONT
4H 863	7XQB	4-213	B11	GRP4 Fuel valve CONT
1H 864	12XQA	13-215	D 2	ENG1 CHARGE AIR PRESS IND
2H 864	13XQA	13-216	B20	ENG2 CHARGE AIR PRESS IND
3H 864	12XQA	13-215	F 3	ENG3 CHARGE AIR PRESS IND
4H 864	13XQA	13-216	B21	ENG4 CHARGE AIR PRESS IND
H1000	5XQC	2-213	B17	GRP1 Temp Selector auto Sup and Cont
H1001	8XQC	4-213	E11	GRP2 Temp Selector auto Sup and Cont
H1002	6XQC	2-213	G16	GRP3 Temp Selector auto Sup and Cont
H1003	7XQA	4-213	B12	GRP4 Temp Selector auto Sup and Cont

COMPRESSION - REMOVAL/INSTALLATION

WARNING : OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN CHAPTER 24-00-00.

1. General

This topic describes the removal procedure for all secondary equipment for which removal has not been dealt with in this chapter.

Certain of the instruments on the flight compartment control panels require removal of the associated electro-luminescent
R panel (Ref. 33-16-00). The panels are interconnected by flying
R leads or connected by terminals located at the rear of the panels.

R 2. Magnetic Indicators

A. Prepare

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(2) Trip, safety and tag the following circuit breakers :
R (Ref. NOTE 1).

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 1 B/VALVE COND AND OVER PRESS IND	1-213	1H 611	D10
ENG 1 C/BLEED VALVE CONT		1H 861	D12
GRP 1 AIR GEN CONT AND IND		1H 862	D13
ENG 2 B/VALVE COND AND OVER PRESS IND	5-213	2H 611	A 8
ENG 2 C/BLEED VALVE CONT		2H 861	F 8
GRP 2 GEN CONT AND IND		2H 862	F 9
ENG 3 B/VALVE COND AND OVER PRESS IND	15-215	3H 611	A 4
ENG 3 C/BLEED VALVE CONT		3H 861	B 4
GRP 3 AIR GEN CONT AND IND		3H 862	B 3
ENG 4 B/VALVE COND AND OVER PRESS IND	15-216	4H 611	A23
ENG 4 C/BLEED VALVE CONT		4H 861	B24

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP 4 GEN CONT AND IND		4H 862	B23

NOTE 1 :

For BLEED VALVES magnetic indicators : 1H644-2H644-3H644-4H644
Trip circuit breakers : 1H611-2H611-3H611-4H611

For CROSS BLEED magnetic indicators : 1H873-2H873-3H873-4H873
Trip circuit breakers : 1H861-2H861-3H861-4H861

For COND VALVE magnetic indicators : 1H874-2H874-3H874-4H874
For JET PUMP magnetic indicators : 1H876-2H876-3H876-4H876
For RAM AIR magnetic indicators : 1H877-2H877-3H877-4H877
For FUEL VALVE magnetic indicators : 1H878-2H878-3H878-4H878
Trip circuit breakers : 1H862-2H862-3H862-4H862

(3) Loosen quick-release fasteners, open AIR BLEED CONTROL panel.

B. Remove
(Ref. Fig. 401)

(1) Remove electro-luminescent panel (Ref. 33-16-00).

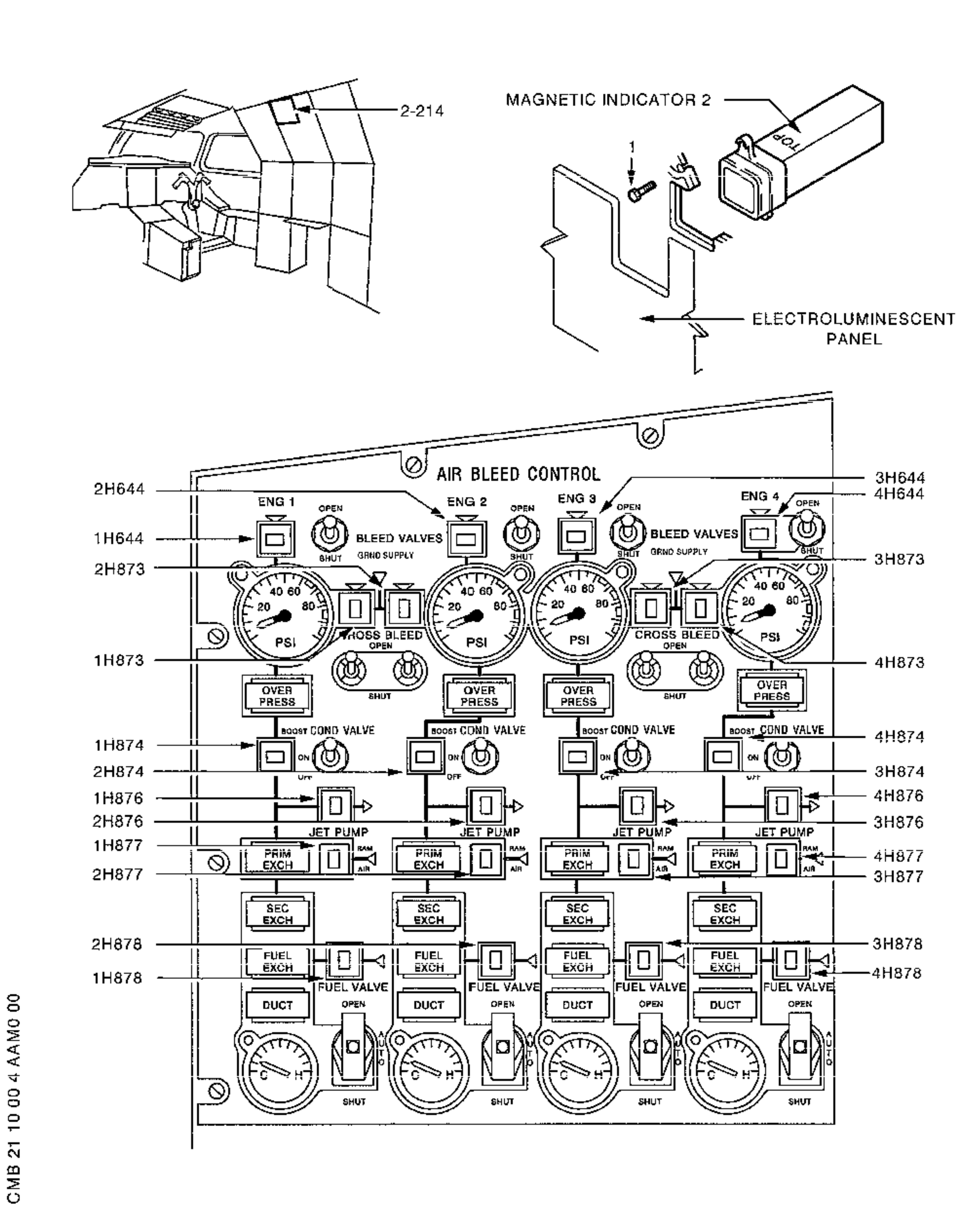
(2) If necessary, remove cable ties in order to obtain easy access to the equipment concerned.

(3) Disconnect electrical cables from terminals. Use a suitable insertion/extraction tool for magnetic indicators equipped with pin type connectors.

(4) Loosen attachment screws (1) remove magnetic indicator (2) from the rear of panel.

C. Install
R (Ref. Fig. 401)
R
R (1) Install magnetic indicator (2) tighten screws (1).

NOTE : Install magnetic indicator on panel with the



Magnetic Indicators - Removal/Installation
Figure 401

word TOP adjacent to white line on back of panel.

R (2) Connect electrical cables to magnetic indicator. On indicators equipped with pin type connectors use a suitable insertion/extraction tool. Make certain that connections are made in conformity with electrical cable identifiers and associated wiring diagrams.

R (3) Install electro-luminescent panel (Ref. 33-16-00).

R (4) Install cable ties if necessary.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

R (5) Close the panel, fully tighten quick-release fasteners

CAUTION : WHEN CLOSING PANEL, CHECK THAT NO CABLES ARE CAUGHT OR DAMAGED.

D. Test

R (1) Connect electrical ground power unit and energize the
R aircraft electrical network (Ref. 24-41-00, Servicing).

R (2) Check correct operation of magnetic indicator by carrying out the appropriate test procedure.

3. Caption Lights

A. Prepare

(1) De-energize the aircraft electrical network and dis-
R connect electrical ground power unit (Ref. 24-41-00,
R Servicing).

(2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 1 B/VALVE COND AND OVER PRESS IND	1-213	1H 611	D10
GRP 1 AIR COND VALVE CLOSE AND AIR GEN IND		1H 612	D11
ENG 2 B/VALVE COND AND OVER PRESS IND	5-213	2H 611	A 8
GRP 2 AIR COND VALVE CLOSE AND AIR GEN		2H 612	A 9
ENG 3 B/VALVE COND AND OVER PRESS IND	15-215	3H 611	A 4
GRP 3 AIR COND VALVE CLOSE AND AIR GEN IND		3H 612	A 3
ENG 4 B/VALVE CONT AND OVER PRESS IND	16-216	4H 611	A23
GRP 4 AIR COND VALVE CLOSE AND AIR GEN IND		4H 612	A24

(3) Loosen quick-release fasteners, open AIR BLEED CONTROL panel or TEMPERATURE CONTROL panel if LEAK caption lights (1H630, 2H630, 3H630, 4H630) are removed.

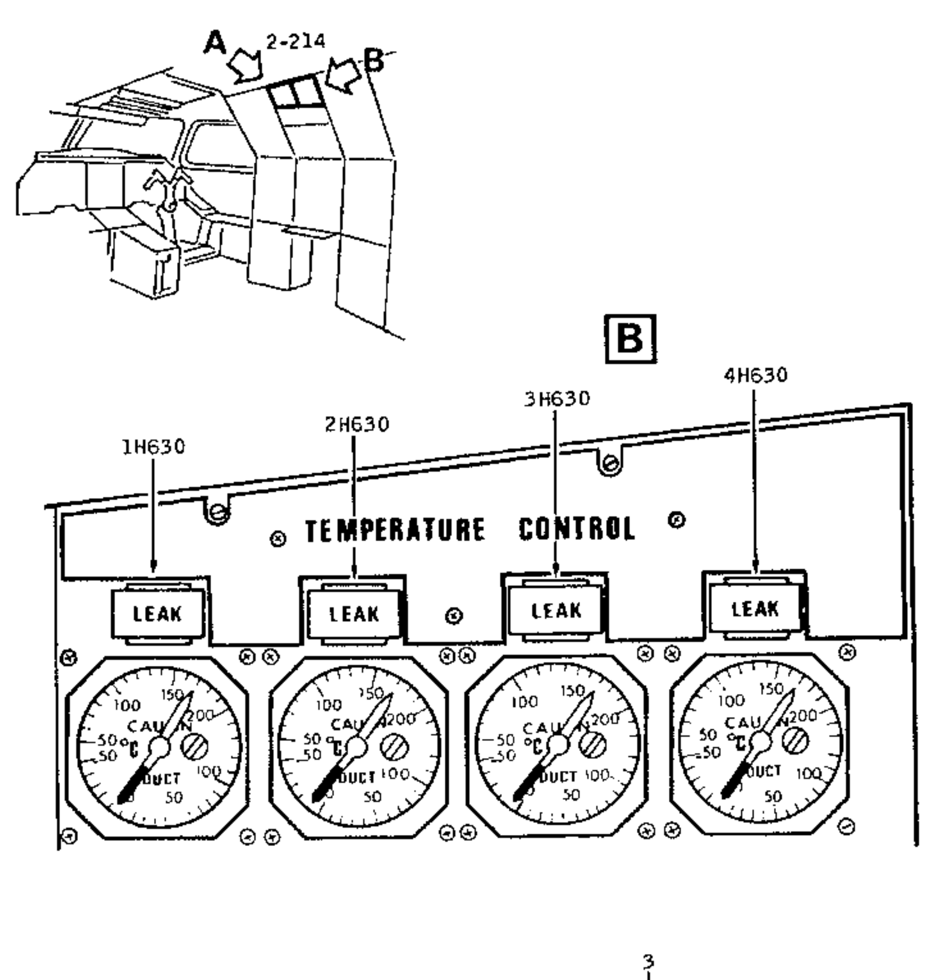
B. Remove
(Ref. Fig. 402)

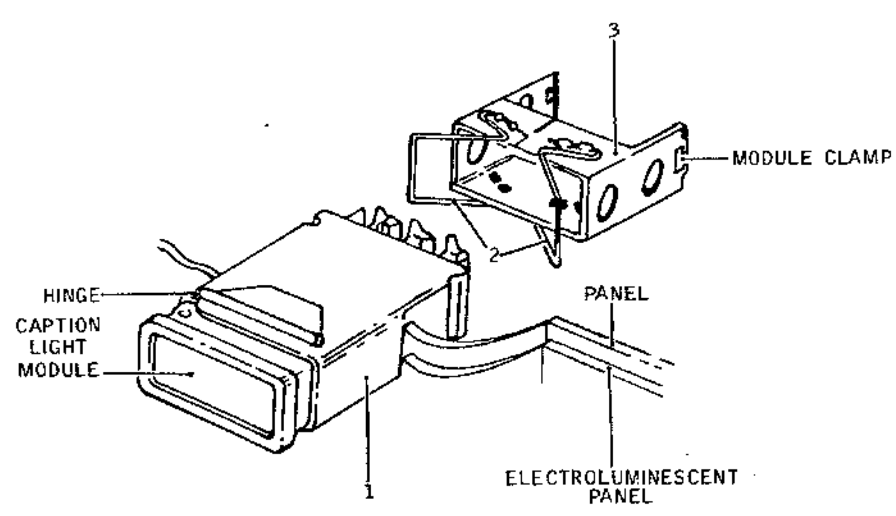
(1) If necessary remove cable ties in order to obtain easy access to the terminals of the equipment concerned.

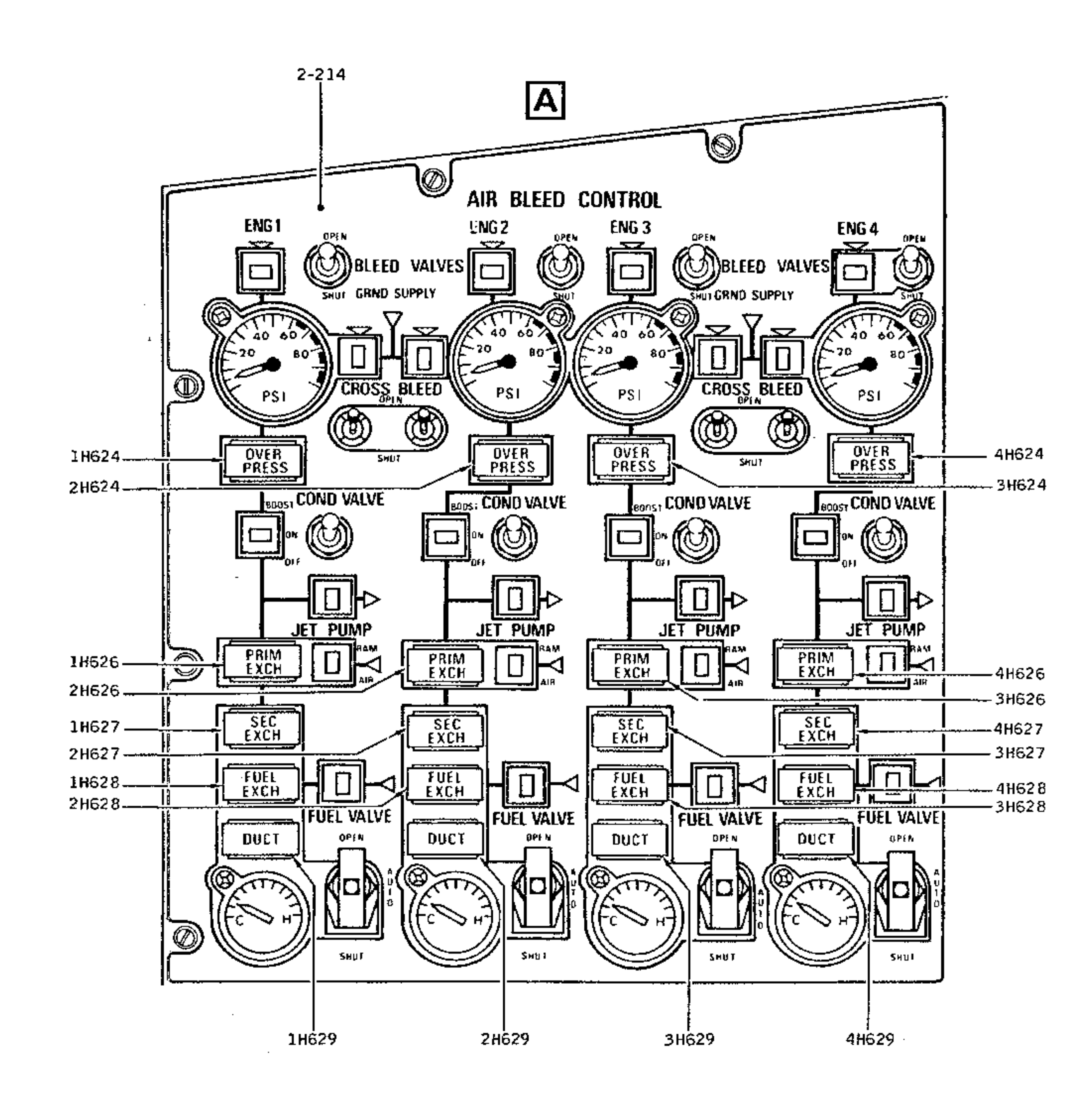
(2) Disconnect cables from terminals. Use a suitable insertion/extraction tool on caption lights equipped with pin type connectors.

(3) Disengage springs (2) holding mounting clamp (3) and remove caption light (1) from front of panel.

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Caption Light Removal/Installation
Figure 402

C. Install
R (Ref. Fig. 402)
R
R (1) Position mounting clamp (3) behind panel. Install caption light in its housing.

NOTE : Install caption lights on panel with hinge adjacent to white line on back of panel.

R (2) Hold caption light (1) against front of panel and press home mounting clamp (3) until the securing springs engage in grooves on the caption light module.

R (3) Connect electrical cables to caption light. Use the appropriate insertion/extraction tool on lights equipped with pin type connectors. Make certain that connections are made in confirmity with the electrical cable identifiers and associated wiring diagrams.

R (4) Replace cable ties if necessary.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

R (5) Close the panel. Tighten quick-release fasteners.

CAUTION : WHEN CLOSING THE PANEL, CHECK THAT NO CABLES ARE CAUGHT OR DAMAGED.

D. Test

R (1) Connect electrical ground power unit and energize
R the aircraft electrical network (Ref. 24-41-00,
R Servicing).

R (2) Check the correct operation of the caption light by
R carrying out the appropriate test procedures.

4. Switches

A. Prepare

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(2) Trip, safety and tag the following circuit breakers :
R (Ref. NOTE 2)

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 1 B/VALVE COND AND OVER PRESS IND	1-213	1H 611	D10
GRP 1 AIR COND VALVE CLOSE AND AIR GEN IND		1H 612	D11
ENG 1 C/BLEED VALVE CONT		1H 861	D12
GRP 1 FUEL VALVE CONT		1H 863	D16
ENG 2 B/VALVE COND AND OVER PRESS IND	5-213	2H 611	A 8
GRP 2 AIR COND VALVE CLOSE AND AIR GEN		2H 612	A 9
ENG 2 C/BLEED VALVE CONT		2H 861	F 8
GRP 2 FUEL VALVE CONT		2H 863	E12
ENG 3 B/VALVE COND AND OVER PRESS IND	15-215	3H 611	A 4
GRP 3 AIR COND VALVE CLOSE AND AIR GEN IND		3H 612	A 3
ENG 3 C/BLEED VALVE CONT		3H 861	B 4
GRP 3 FUEL VALVE CONT		3H 863	F16
ENG 4 B/VALVE CONT AND OVER PRESS IND	16-216	4H 611	A23
GRP 4 AIR COND VALVE CLOSE AND AIR GEN IND		4H 612	A24
ENG 4 C/BLEED VALVE COND		4H 861	B24
GRP 4 FUEL VALVE CONT		4H 863	B11

NOTE 2 :
For BLEED VALVE switches : 1H613-2H613-3H613-4H613
Trip circuit breakers : 1H611-2H611-3H611-4H611

For CROSS BLEED switches : 1H865-2H865-3H865-4H865
Trip circuit breakers : 1H861-2H861-3H861-4H861

For COND VALVE switches : 1H866-2H866-3H866-4H866
Trip circuit breakers : 1H612-2H612-3H612-4H612

For FUEL VALVE switches : 1H867-2H867-3H867-4H867
Trip circuit breakers : 1H863-2H863-3H863-4H863

(3) Loosen quick release fasteners, open AIR BLEED control panel.

B. Remove

(1) FUEL VALVE switches 1H867, 2H867, 3H867, 4H867.
(Ref. Fig. 403)

(a) Remove ties if necessary in order to obtain easy access to equipment terminals.

(b) Remove cables from terminals. Use the appropriate insertion/extraction tool on switches fitted with pin type connectors.

(c) On front of panel, lower switch guard, loosen and remove switch securing nut.

(d) Remove locking washer, remove switch guard and locating washer.

(e) Remove switch.

(2) COND VALVE switches 1H866, 2H866, 3H866, 4H866 and BLEED VALVE switches 1H613, 2H613, 3H613, 4H613 (marked A).
R (Ref. Fig. 404)

(3) CROSS BLEED switches 1H865, 2H865, 3H865, 4H865 (marked B).
R (Ref. Fig. 404)

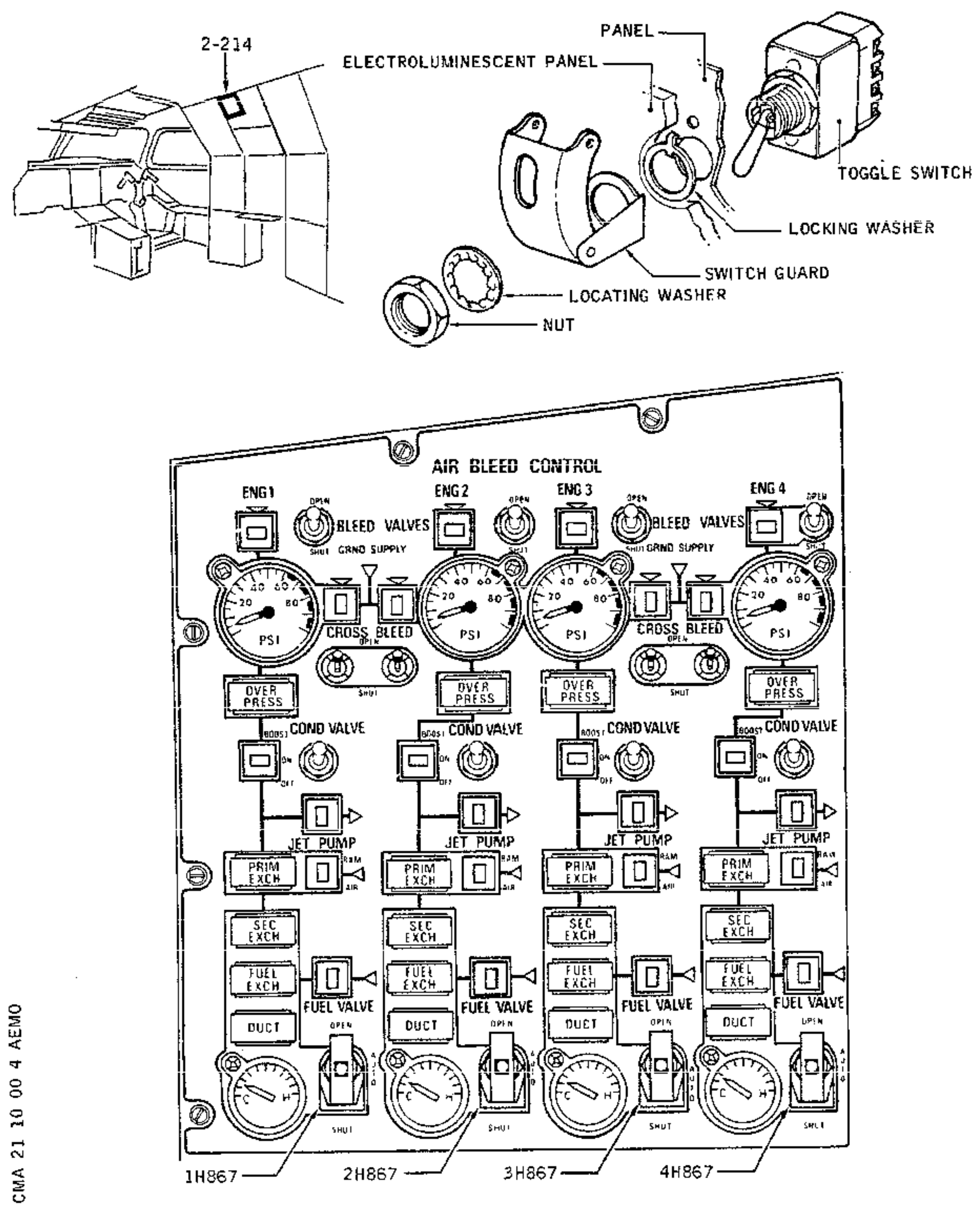
(a) Remove cable ties if necessary in order to obtain easy access to equipment terminals.

(b) Remove cables from terminals. Use the appropriate insertion/extraction tool on switches fitted with pin type connectors.

(c) Remove locking washer and locating washer.

(d) Remove the switch.

C. Install



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FUEL VALVE Switch Removal/Installation
Figure 403

R

2-214

A

1H613 2H613 3H613 4H613

AIR BLEED CONTROL

ENG 1 ENG 2 ENG 3 ENG 4

BLEED VALVES

GRND SUPPLY

CROSS BLEED

PSI

OVER PRESS

COND VALVE

JET PUMP

PRIM EXCH

SEC EXCH

FUEL EXCH

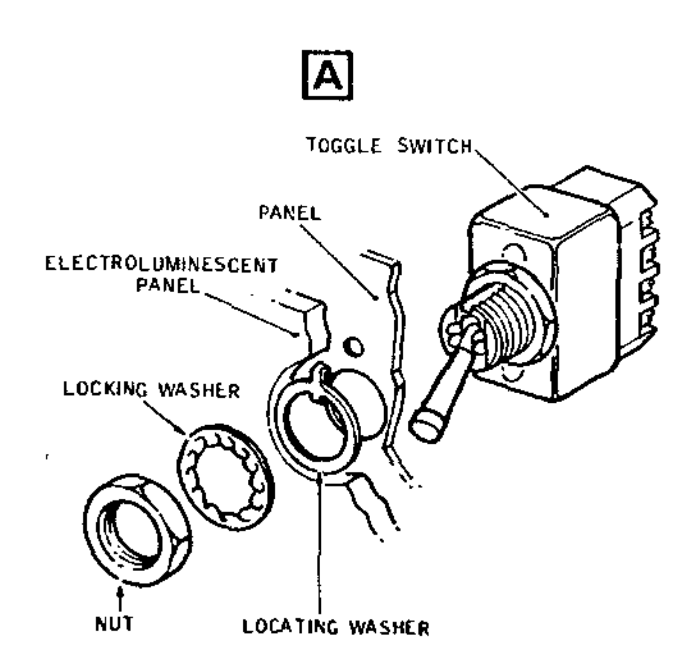
FUEL VALVE

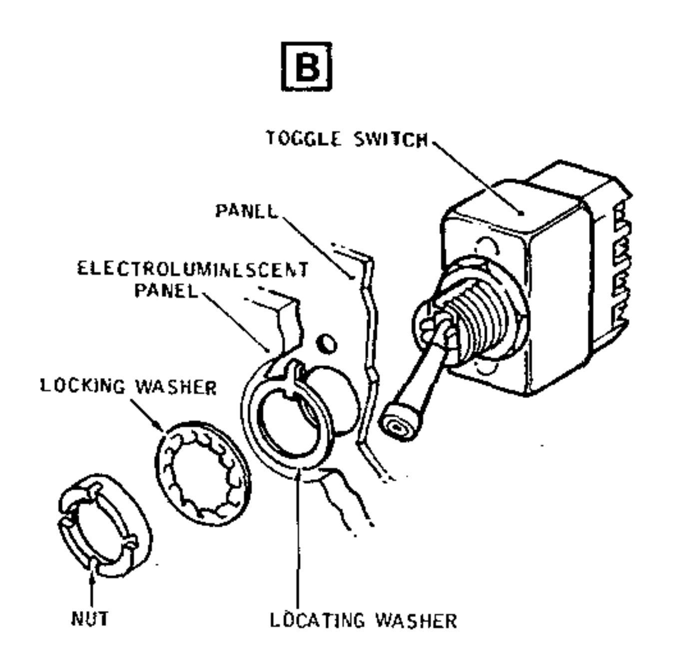
DUCT

B: 1H865, 2H865, 3H865, 4H865

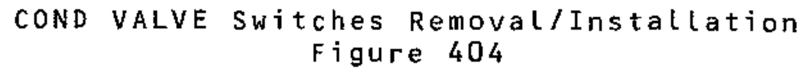
A: 1H866, 2H866, 3H866, 4H866

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R


COND VALVE Switches Removal/Installation
Figure 404

(1) FUEL VALVE switches.
R (Ref. Fig. 403)
R
R (a) Install switch in alignment with locating washer.

R (b) Install locating washer, switch guard and locking washer.

R (c) Tighten securing nut.

R (d) Connect cable to switch. Use a suitable insertion/extraction tool on switches fitted with pin type connectors. Make certain that connections are made in conformity with the electrical cable identifiers and associated wiring diagrams.

R (e) Replace the cable ties if necessary.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

R (f) Close panel. Remove quick-release fasteners.

CAUTION : WHEN CLOSING PANEL CHECK THAT NO CABLES ARE CAUGHT OR DAMAGED.

(2) COND VALVE and CROSS BLEED switches.
R (Ref. Fig. 404)
R
R (a) Install switch in alignment with locating washer.

R (b) Position locatinf washer and locking washer.

R (c) Tighten attachment nut.

R (d) Connect electrical cable to switch. Use a suitable insertion/extraction tool on switches fitted with pin type connectors. Make certain that connections are made in conformity with the electrical cable identifiers and associated wiring diagrams.

R (e) Replace the electrical cable ties if necessary.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

R (f) Close panel. Fully tighten quick-release fasteners.

CAUTION : WHEN CLOSING PANEL CHECK THAT NO WIRES ARE CAUGHT OR DAMAGED.

D. Test

R (1) Connect electrical ground power unit and energize the
R aircraft electrical network (Ref. 24-41-00, Servicing).

R (2) Check the correct operation of the switch by carrying out the appropriate test procedure.

R 5. Diode - Resistance - Capacitor

R A. Equipment and Materials for Components

R 1 to 4H631 ; 1 to 4H638 ; 1 to 4H639 ; 1 to 4H669 ;
R 1 to 4H670 ; 1 to 4H674 ; 1 to 4H675 ; 1 to 4H677 ;
R 1 to 4H688 ; 1 to 4H689 ; 1 to 4H690 ; 1 to 4H692 ;
R 1 to 4H693 ; 1 to 4H702 ; 1 to 4H703 ; 1 to 4H704 ;
R 1 to 4H706 ; 1 to 4H710 ; 1 to 4H869 ; 1 to 4H870 ;
R 3 and 4H904 ; 3 and 4H905 ; 1 to 4H895 ; 1 to 4H896 ;
R 1 to 4H897 ; 1 to 4H898 ; 1 to 3H3146

DESCRIPTION	PART NO.
Access Platform 10.7 ft. (3.22 m)	

R B. Prepare

R (1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

R (2) According to the diode to be removed, trip safety and tag one of the following circuit breakers :

IDENTIFIER	CORRESPONDING CIRCUIT BREAKER			
	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
1H631	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
1H638	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
1H639	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
1H640	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
1H641	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
1H642	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
1H643	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
1H669	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11

IDENTIFIER	CORRESPONDING CIRCUIT BREAKER			
	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
1H670	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
1H674	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
1H675	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
1H677	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
1H688	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
1H702	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
1H703	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
1H704	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
1H710	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
1H907	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
2H631	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H638	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H639	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H640	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H641	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H642	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H643	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H669	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H670	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H674	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H675	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9

IDENTIFIER	CORRESPONDING CIRCUIT BREAKER			
	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
2H677	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H688	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H702	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H703	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H704	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H710	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H907	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
3H631	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H638	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H639	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H640	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H641	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H642	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H643	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H669	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H670	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H674	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H675	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H677	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H688	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H702	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3

IDENTIFIER	CORRESPONDING CIRCUIT BREAKER			
	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
3H703	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H704	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H710	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H907	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
4H631	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H638	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H639	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H640	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H641	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H643	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H669	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H670	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H674	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H675	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H677	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H688	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H702	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H703	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H704	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H710	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H907	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24

IDENTIFIER	CORRESPONDING CIRCUIT BREAKER			
	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
1H689	GR1 FUSELAGE ENTRY SAFETY VALVE SUP	1-213	1H 680	E12
1H690	GR1 FUSELAGE ENTRY SAFETY VALVE SUP	1-213	1H 680	E12
1H706	GR1 FUSELAGE ENTRY SAFETY VALVE SUP	1-213	1H 680	E12
2H689	GRP2 FUSELAGE ENTRY SAFETY VALVE SUP	5-213	2H 680	E10
2H690	GRP2 FUSELAGE ENTRY SAFETY VALVE SUP	5-213	2H 680	E10
2H706	GRP2 FUSELAGE ENTRY SAFETY VALVE SUP	5-213	2H 680	E10
3H689	GRP3 FUSELAGE ENTRY SAFETY VALVE SUP	15-215	3H 680	F 3
3H690	GRP3 FUSELAGE ENTRY SAFETY VALVE SUP	15-215	3H 680	F 3
3H706	GRP3 FUSELAGE ENTRY SAFETY VALVE SUP	15-215	3H 680	F 3
4H689	GRP4 FUSELAGE ENTRY SAFETY VALVE SUP	15-216	4H 680	F25
4H690	GRP4 FUSELAGE ENTRY SAFETY VALVE SUP	15-216	4H 680	F25
4H706	GRP4 FUSELAGE ENTRY SAFETY VALVE SUP	15-216	4H 680	F25
1H692	ENG1 B VALVE CONT - OVER PRESS IND	1-213	1H 611	D10
1H693	ENG1 B VALVE CONT - OVER PRESS IND	1-213	1H 611	D10
1H3146	ENG1 B VALVE CONT - OVER PRESS IND	1-213	1H 611	D10
2H692	ENG2 B VALVE CONT - OVER PRESS IND	5-213	2H 611	A 8
2H693	ENG2 B VALVE CONT - OVER PRESS IND	5-213	2H 611	A 8
2H3146	ENG2 B VALVE CONT - OVER PRESS IND	5-213	2H 611	A 8
3H692	ENG3 B VALVE CONT -	15-215	3H 611	A 4

	IDENTIFIER	CORRESPONDING CIRCUIT BREAKER			
R		SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R		OVER PRESS IND			
R	3H693	ENG3 B VALVE CONT - OVER PRESS IND	15-215	3H 611	A 4
R	3H3146	ENG3 B VALVE CONT - OVER PRESS IND	15-215	3H 611	A 4
R	4H692	ENG4 B VALVE CONT - OVER PRESS IND	15-216	4H 611	A23
R	4H693	ENG4 B VALVE CONT - OVER PRESS IND	15-216	4H 611	A23
R	4H3146	ENG4 B VALVE CONT - OVER PRESS IND	15-216	4H 611	A23
R	1H869	GRP1 AIR GEN CONT IND	1-213	1H 862	D13
R	1H870	GRP1 AIR GEN CONT IND	1-213	1H 862	D13
R	1H895	GRP1 AIR GEN CONT IND	1-213	1H 862	D13
R	1H896	GRP1 AIR GEN CONT IND	1-213	1H 862	D13
R	1H897	GRP1 AIR GEN CONT IND	1-213	1H 862	D13
R	1H898	GRP1 AIR GEN CONT IND	1-213	1H 862	D13
R	1H908	GRP1 AIR GEN CONT IND	1-213	1H 862	D13
R	2H869	GRP2 AIR GEN CONT - IND	5-213	2H 862	F 9
R	2H870	GRP2 AIR GEN CONT - IND	5-213	2H 862	F 9
R	2H895	GRP2 AIR GEN CONT - IND	5-213	2H 862	F 9
R	2H896	GRP2 AIR GEN CONT - IND	5-213	2H 862	F 9
R	2H897	GRP2 AIR GEN CONT - IND	5-213	2H 862	F 9
R	2H898	GRP2 AIR GEN CONT - IND	5-213	2H 862	F 9
R	2H908	GRP2 AIR GEN CONT - IND	5-213	2H 862	F 9
R	3H869	GRP3 AIR GEN CONT - IND	15-215	3H 862	B 3
R	3H870	GRP3 AIR GEN CONT - IND	15-215	3H 862	B 3
R	3H895	GRP3 AIR GEN CONT - IND	15-215	3H 862	B 3
R	3H896	GRP3 AIR GEN CONT - IND	15-215	3H 862	B 3
R	3H897	GRP3 AIR GEN CONT - IND	15-215	3H 862	B 3
R	3H898	GRP3 AIR GEN CONT - IND	15-215	3H 862	B 3
R	3H908	GRP3 AIR GEN CONT - IND	15-215	3H 862	B 3
R	4H869	GRP4 AIR GEN CONT IND	15-216	4H 862	B23
R	4H870	GRP4 AIR GEN CONT IND	15-216	4H 862	B23
R	4H895	GRP4 AIR GEN CONT IND	15-216	4H 862	B23
R	4H896	GRP4 AIR GEN CONT IND	15-216	4H 862	B23
R	4H897	GRP4 AIR GEN CONT IND	15-216	4H 862	B23
R	4H898	GRP4 AIR GEN CONT IND	15-216	4H 862	B23

IDENTIFIER	CORRESPONDING CIRCUIT BREAKER			
	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
4H909	GRP4 AIR GEN CONT IND	15-216	4H 862	B23
3H904	GRP4 AIR GEN CONT IND	15-216	4H 862	B23
3H905	GRP4 AIR GEN CONT IND	15-216	4H 862	B23
H1060	TEMP COMPTR IND GRP SELECT MI SUP	5-213	H 999	B 9

(3) Component Location
(Ref. Fig. 405, 406 and 407)
(Ref. Fig. 408, 409 and 410)
(Ref. Fig. 411)

IDENTIFIER	DESCRIPTION	LOCATION
1 and 2H 631	Diode	14-123
3 and 4H 631	Diode	17-123
1 and 2H 638	Diode	14-123
3 and 4H 638	Diode	17-123
1 and 2H 669	Diode	14-123
3 and 4H 669	Diode	17-123
1 and 2H 670	Diode	14-123
3 and 4H 670	Diode	17-123
1 and 2H 674	Diode	14-123
3 and 4H 674	Diode	17-123
1 and 2H 675	Diode	14-123
3 and 4H 675	Diode	17-123
1 and 2H 677	Diode	14-123
3 and 4H 677	Diode	17-123

	IDENTIFIER	DESCRIPTION	LOCATION
R	1 and 2H 688	Diode	7-123
R	3 and 4H 688	Diode	8-123
R	1 and 2H 689	Diode	7-123
R	3 and 4H 689	Diode	8-123
R	1 and 2H 690	Diode	7-123
R	3 and 4H 690	Diode	8-123
R	1 and 2H 692	Diode	7-123
R	3 and 4H 692	Diode	8-123
R	1 and 2H 693	Diode	7-123
R	3 and 4H 693	Diode	8-123
R	1 and 2H 703	Diode	11-123
R	3 and 4H 703	Diode	11-123
R	1 and 2H 704	Diode	11-123
R	3 and 4H 704	Diode	11-123
R	1 and 2H 706	Diode	2-214
R	3 and 4H 706	Diode	2-214
R	1 and 2H 710	Diode	7-123
R	3 and 4H 710	Diode	8-123
R	1 and 2H 869	Diode	14-123
R	3 and 4H 869	Diode	17-123
R	1 and 2H 870	Diode	14-123
R	3 and 4H 870	Diode	17-123
R	1 and 2H 895	Resistor	14-123
R	3 and 4H 895	Resistor	17-123

IDENTIFIER	DESCRIPTION	LOCATION
1 and 2H 896	Capacitor	14-123
3 and 4H 896	Capacitor	17-123
1 and 2H 897	Capacitor	14-123
3 and 4H 897	Capacitor	17-123
1 and 2H 898	Resistor	14-123
3 and 4H 898	Resistor	17-123
3 and 4H 904	Diode	8-123
3 and 4H 905	Diode	8-123
1 and 2H3146	Diode	7-123
3 and 4H3146	Diode	8-123

(4) In zone 123, open access door 123AB for components installed in units 7-123, 8-123, 11-123 and access door 123BB for components installed in units 14-123 and 17-123.
Install access platform.

In flight compartment, open access door 2-214 for diodes 1 to 4H 706.

In flight compartment, remove access door 23-214 for diodes 1 to 4H 640, 1 to 4H 641, 1 to 4H 642, 1 to 4H 643 (Ref. 21-12-72, Removal/Installation, paragraphs A (1) to A (3).

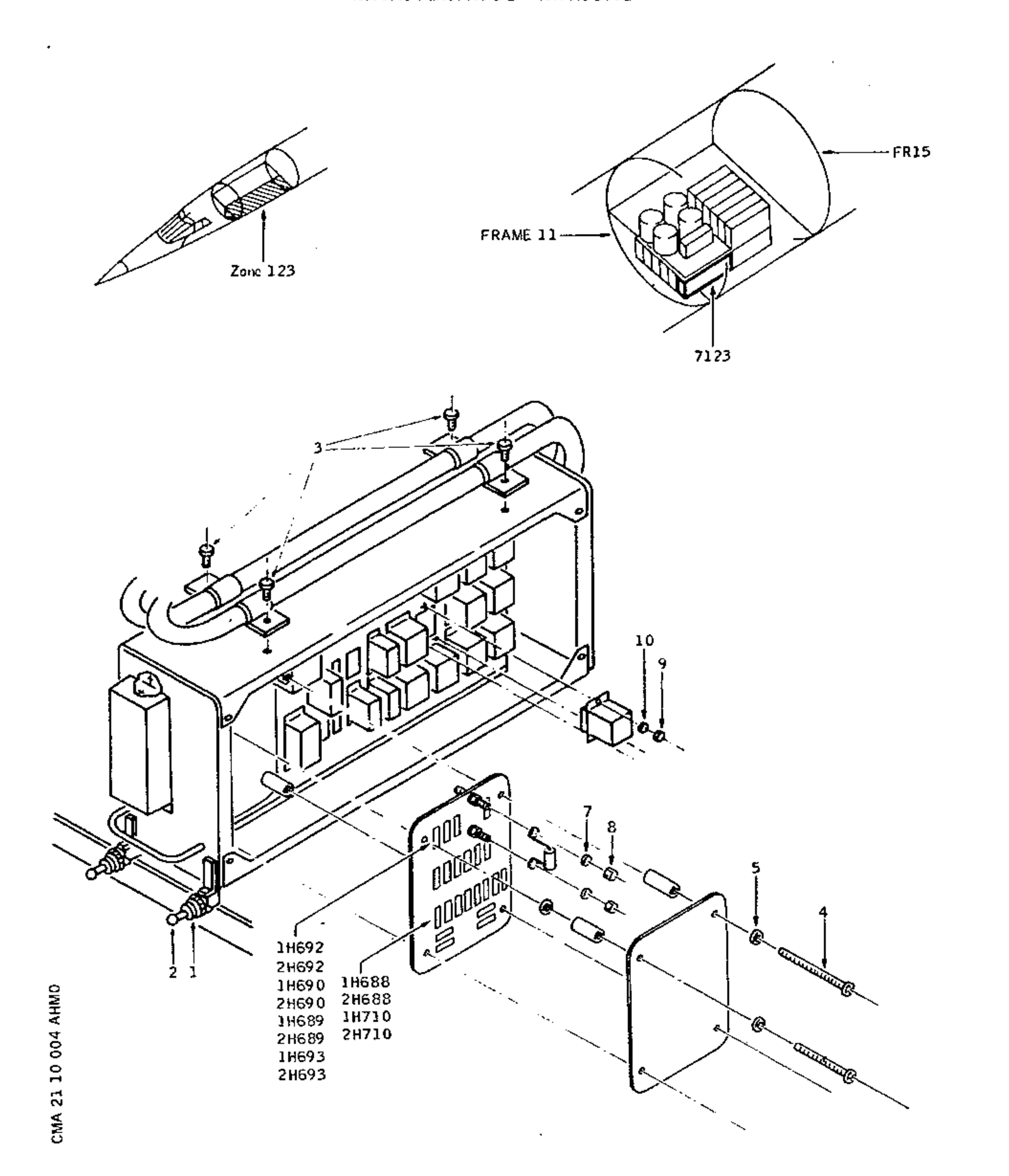
C. Remove

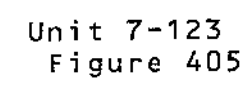
(1) Remove components in units 7-123, 8-123, 11-123, 14-123, 17-123.
(Ref. Fig. 405, 406 and 407)
(Ref. Fig.408 and 409)

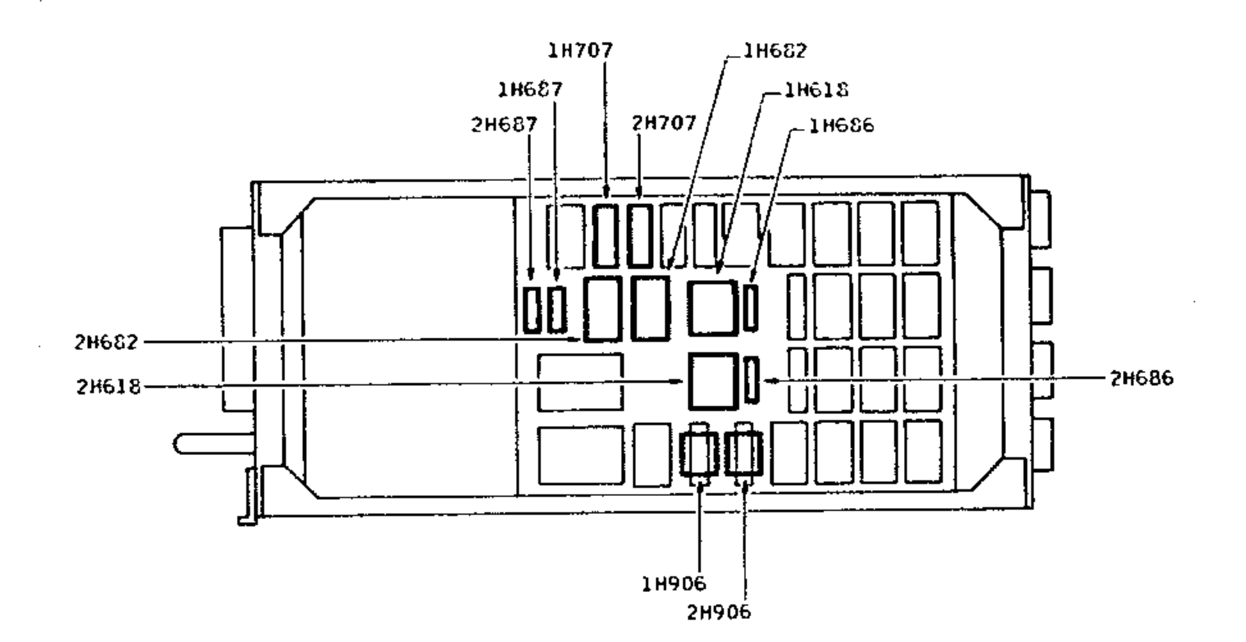
(a) In compartment 123, unscrew knurled nuts (1) and remove fasteners (2) from unit.

(b) Remove cables from top of unit (2) quick-release fasteners securing each clamp (3).

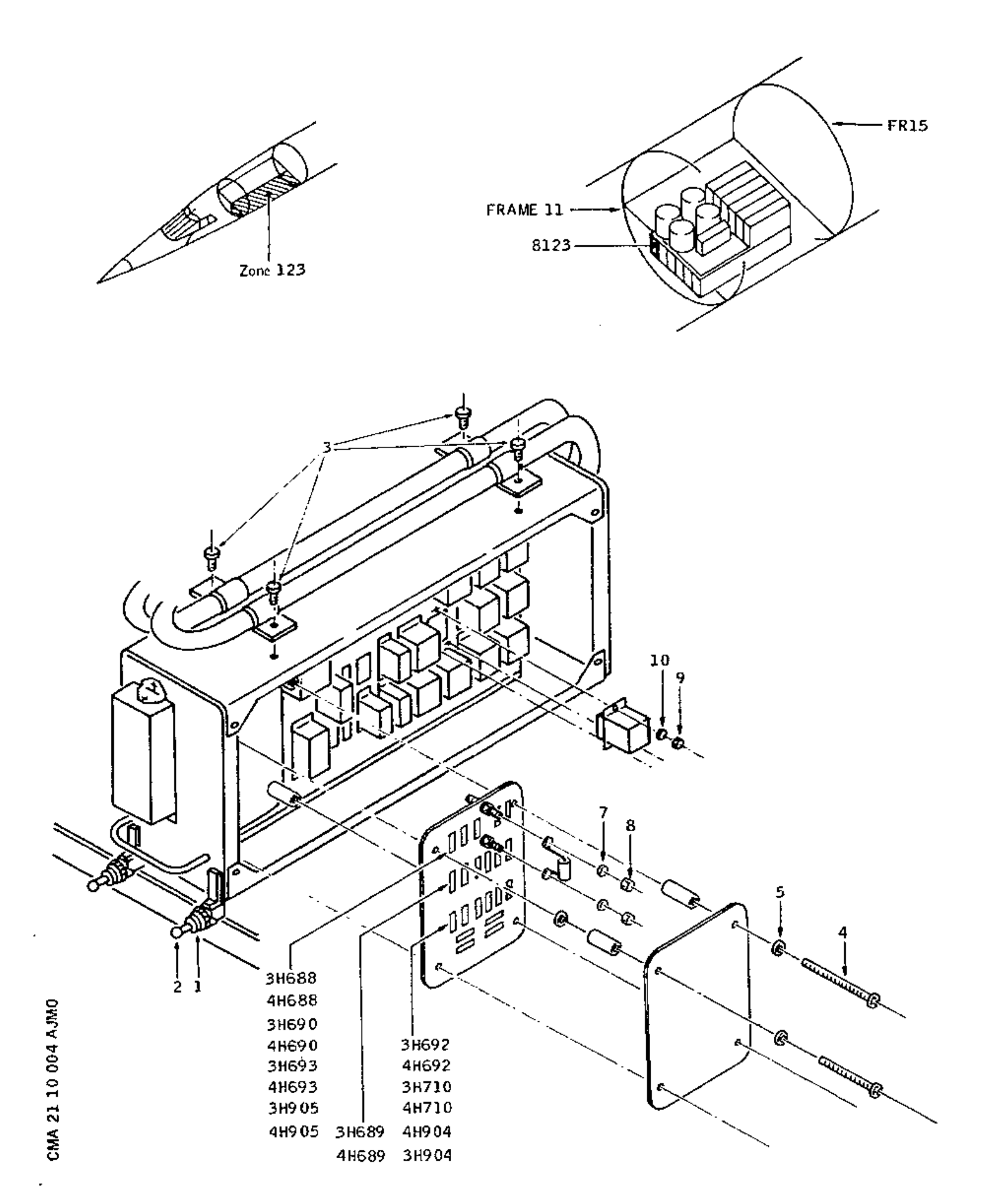
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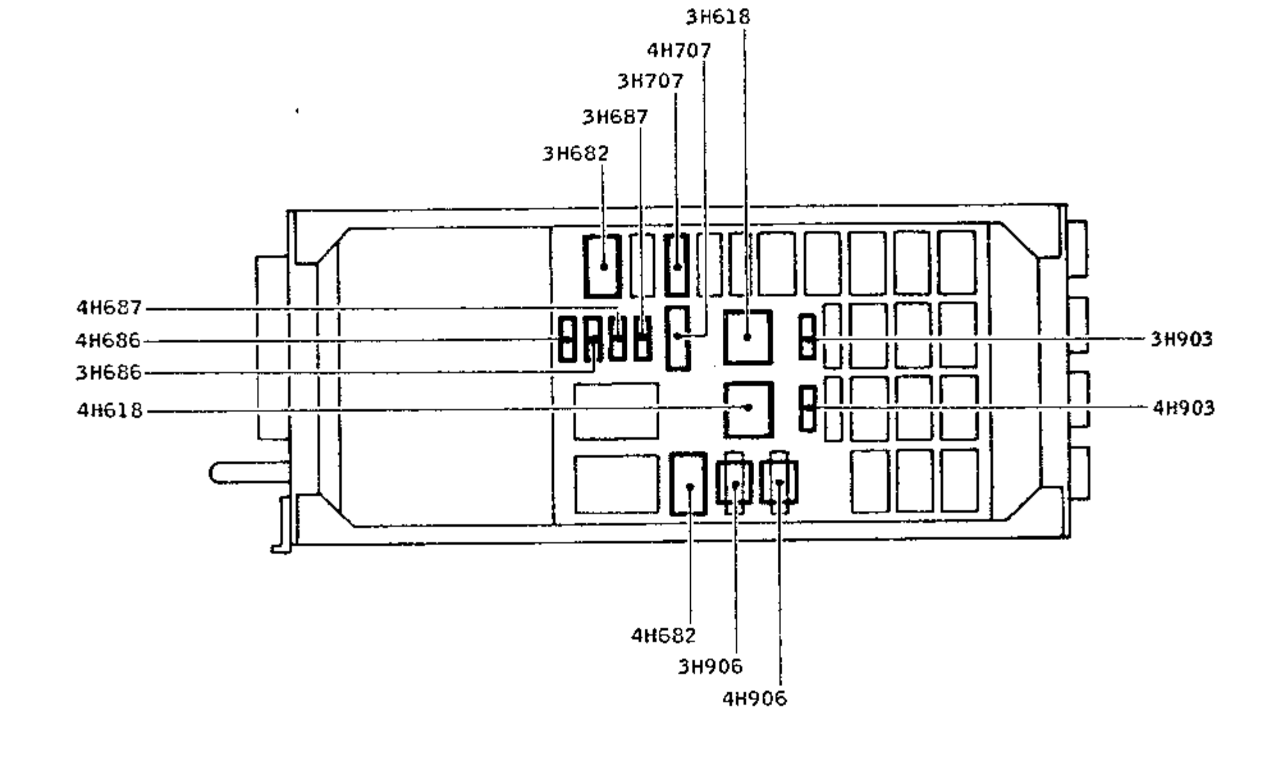

Zone 123
FRAME 11
FR15
7123
3
10
9
7
8
5
4
2
1
1H692
2H692
1H690
2H690
1H689
2H689
1H693
2H693
1H688
2H688
1H710
2H710
CMA 21 10 004 AHM0


Unit 7-123


1H707
1H682
1H687
1H618
2H687
2H707
1H686
2H682
2H618
2H686
1H906
2H906

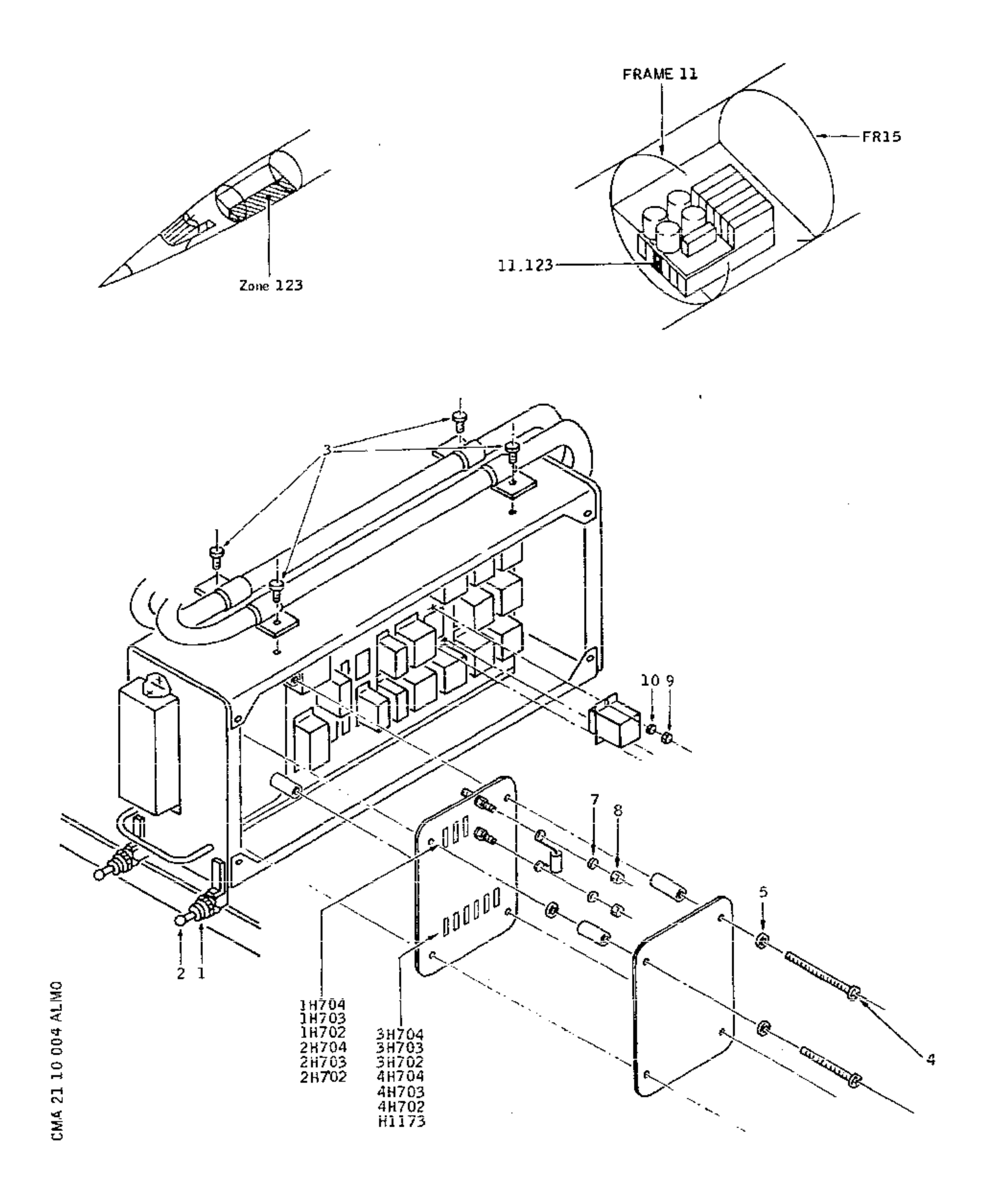
R Figure 405

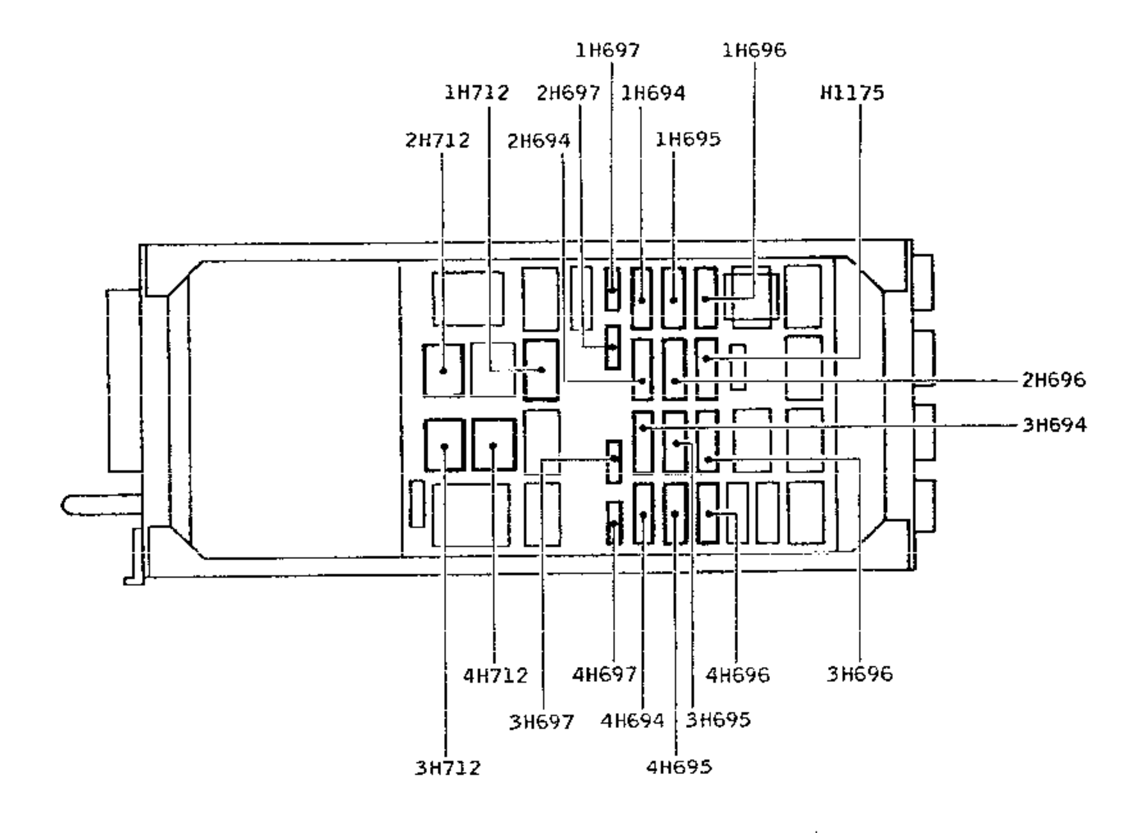




R

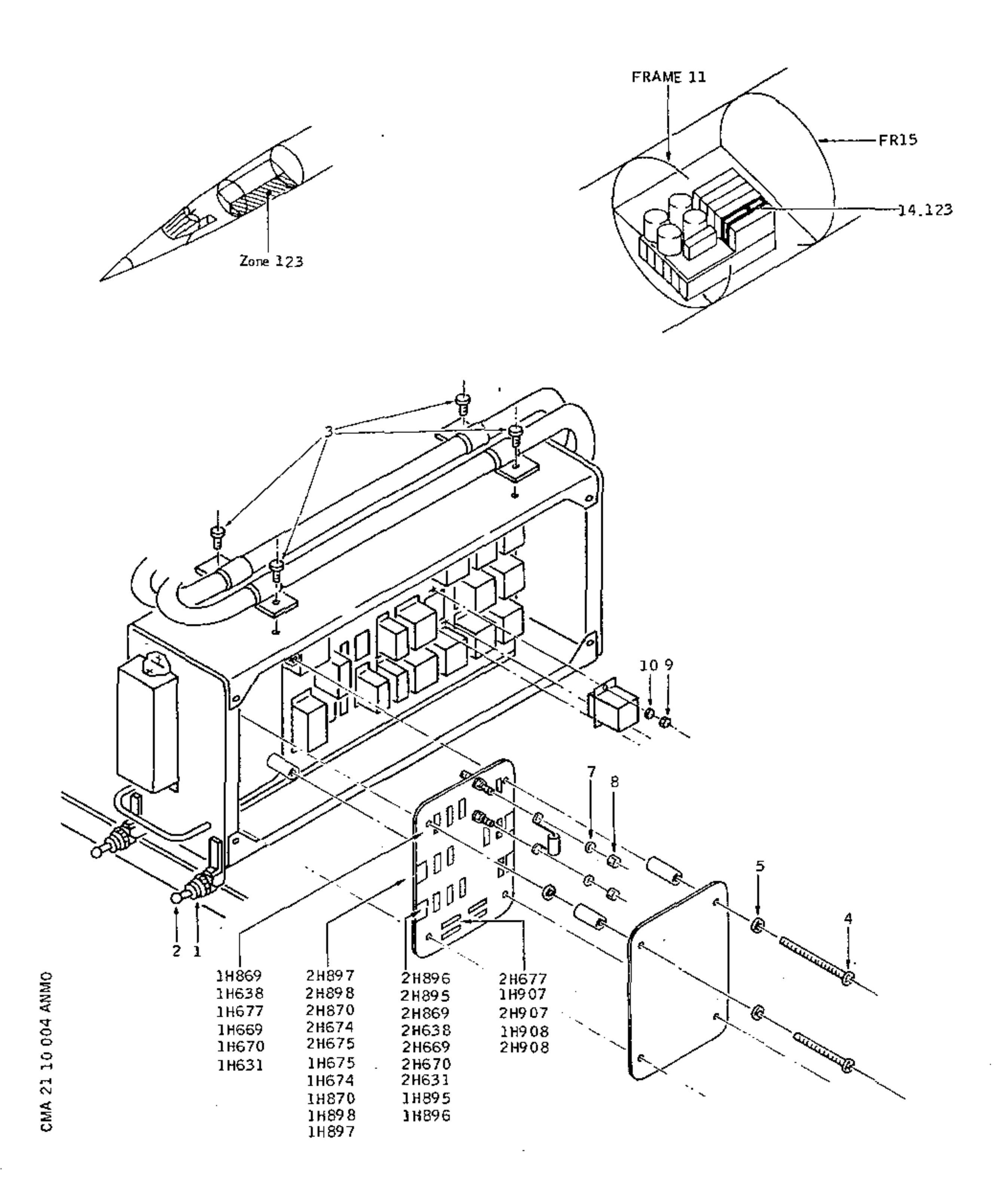
Unit 8-123
Figure 406

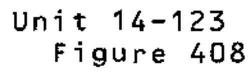


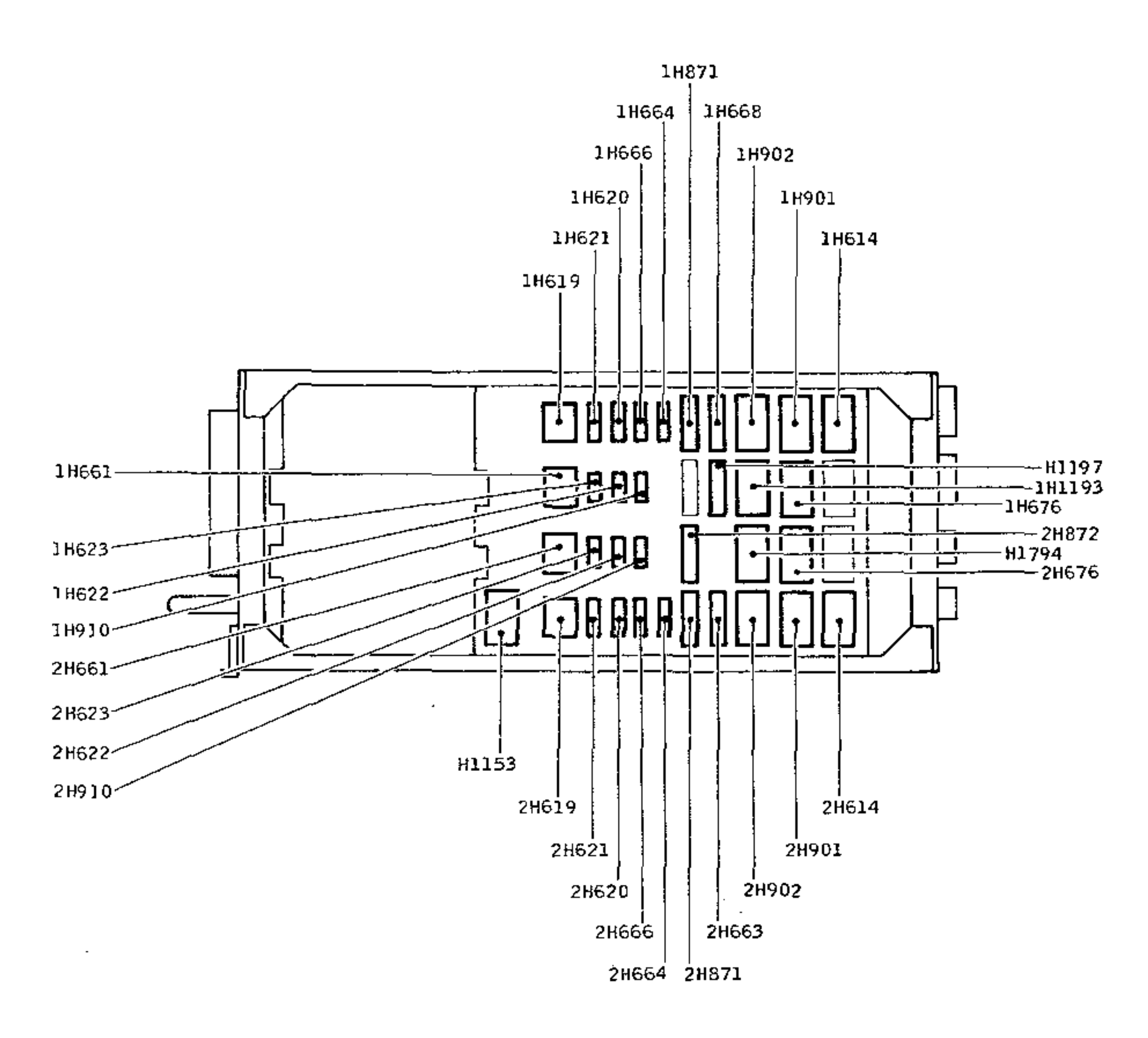


Unit 11-123
Figure 407

R

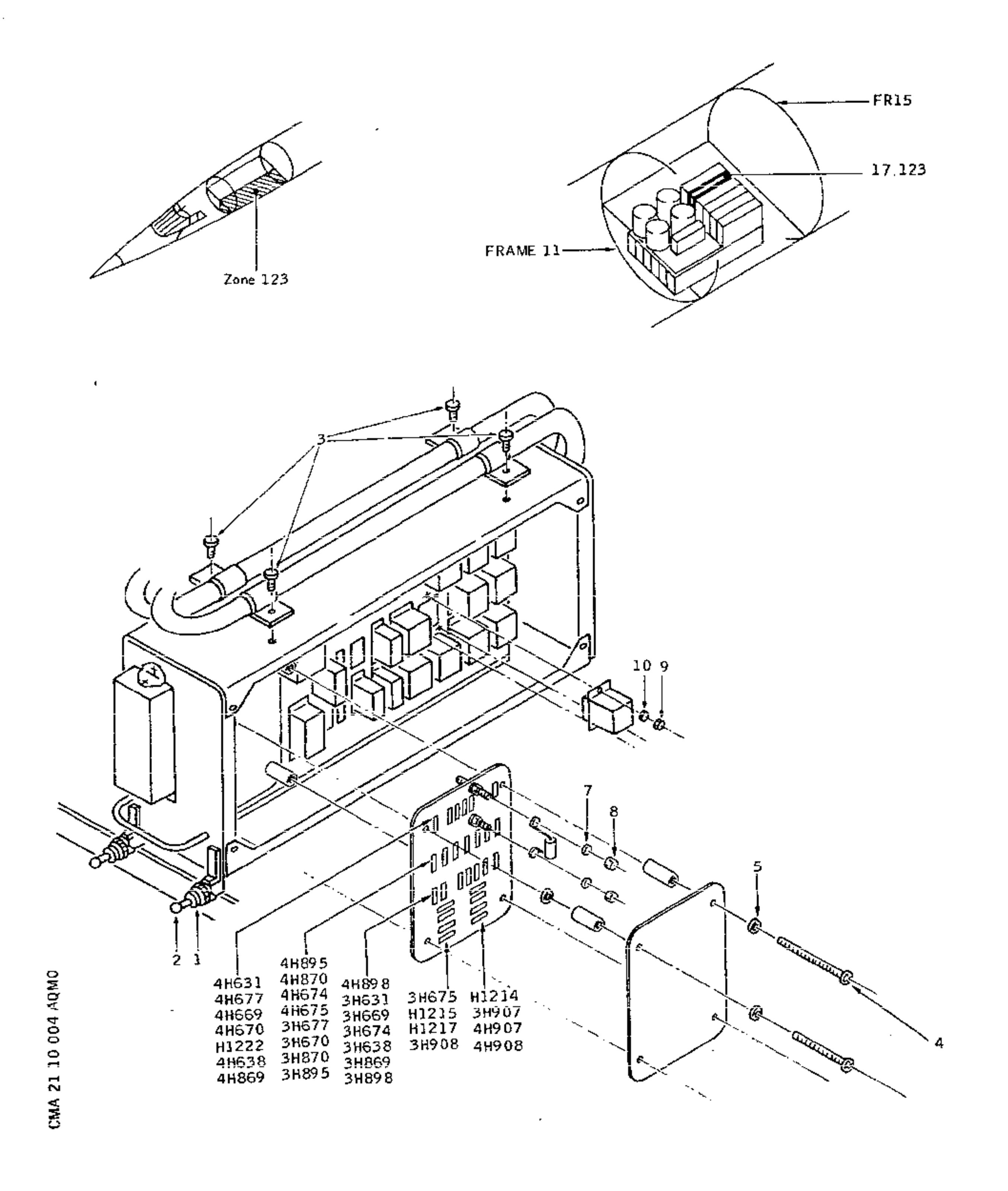


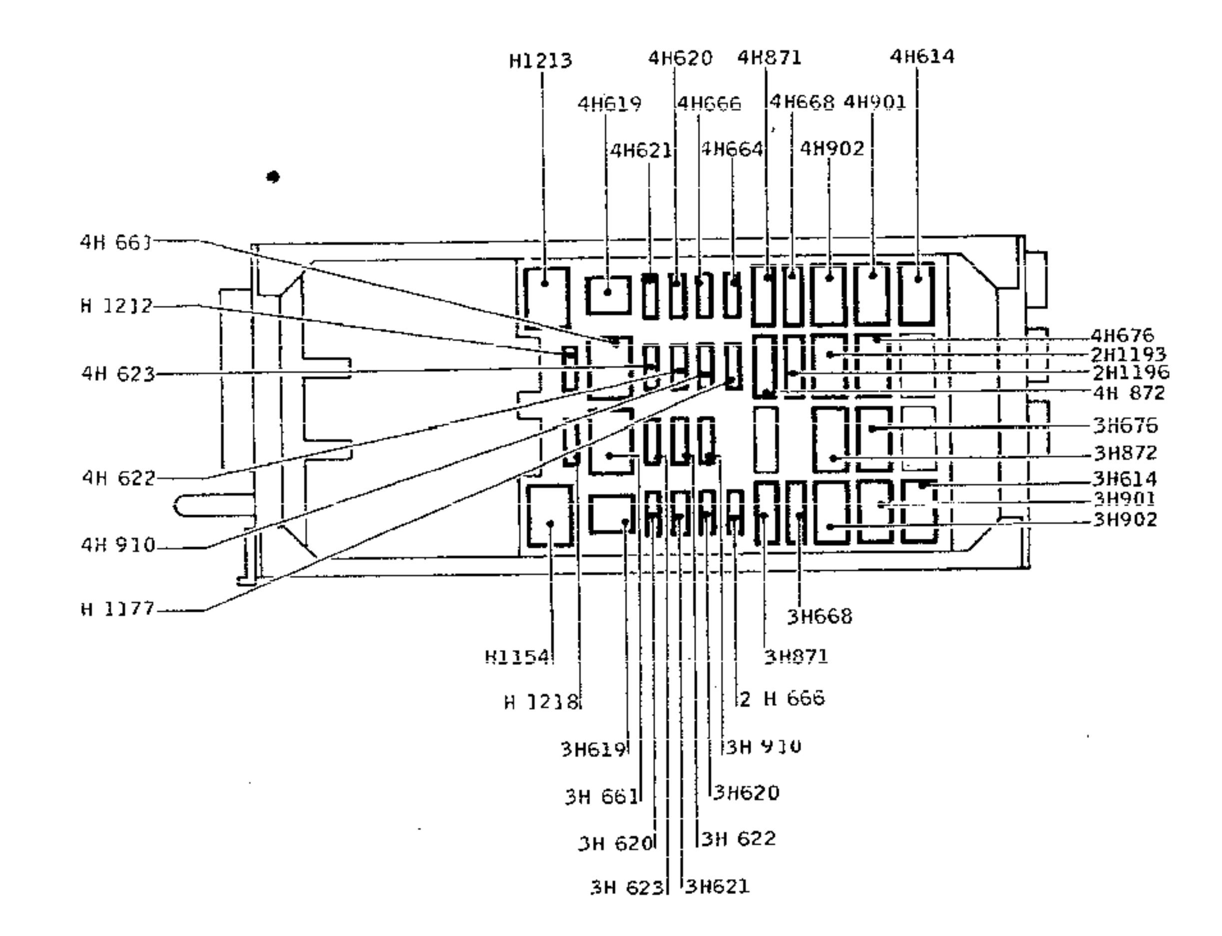




R

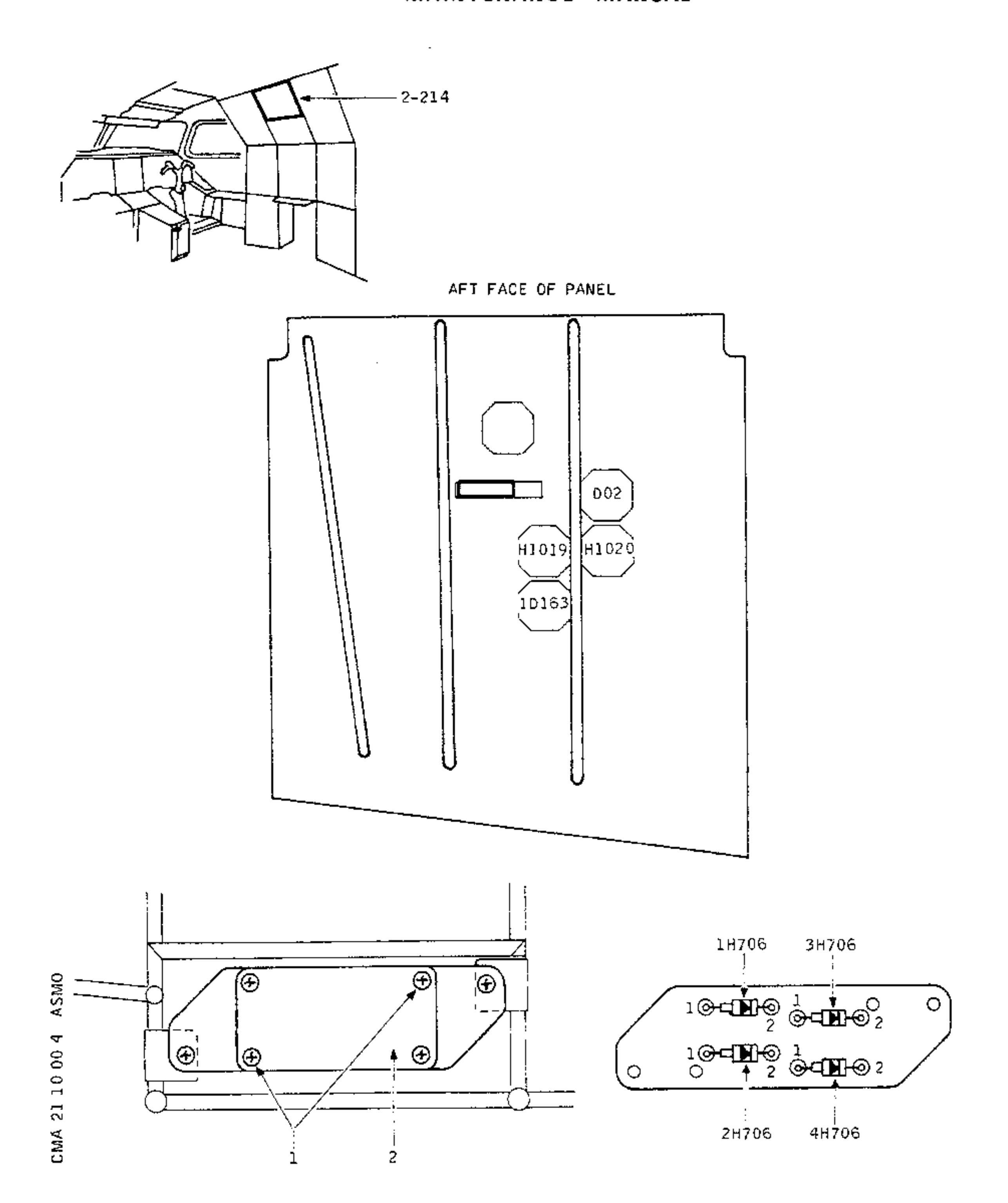
Unit 14-123
Figure 408





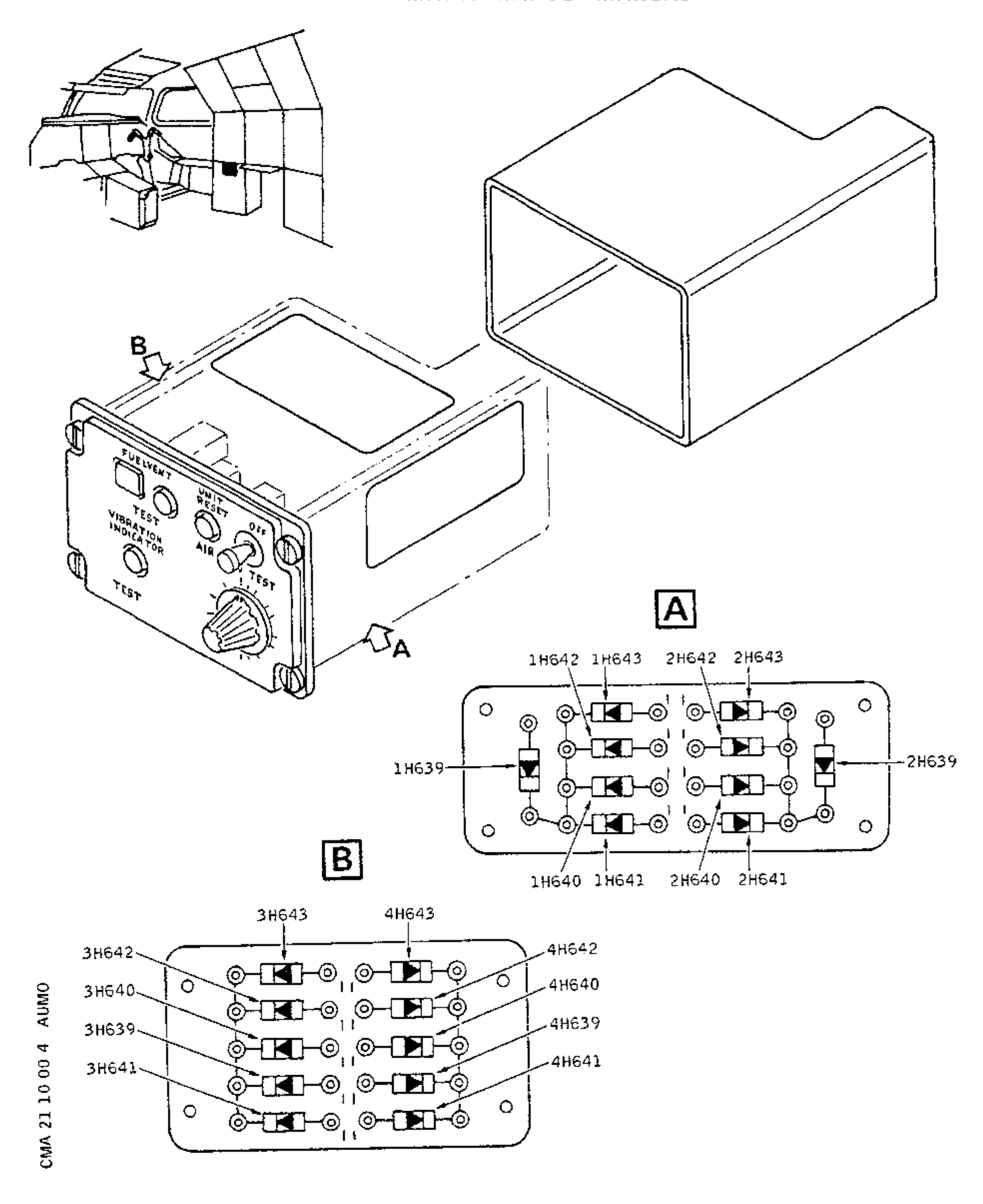
Unit 17-123
Figure 409

R



Unit 2-214
Figure 410

R



Unit 23-214
Figure 411

R

(c) Pull unit forward in order to gain access to unit to be removed.

(d) Remove the four attachment screws from protective plate (4) retain washers, remove the plate.

(e) On diode board, unscrew nuts (6) and (8), remove washers (5) and (7) ; remove the diode.

(2) Remove diodes 1 to 4H 706 on panel 2-214. (Ref. Fig. 410)

(a) On aft face of panel 2-214, remove screws (1), remove protective plate (2) from diode board.

(b) Unsolder the diode to be removed.

<u>CAUTION</u> : BEFORE UNSOLDERING THE DIODE, PROTECT THE CABLES AND EQUIPMENT TO PREVENT DAMAGE BY DROPS OF SOLDER.

(3) Remove diodes 1 to 4H 640, 1 to 4H 641, 1 to 4H 642 1 to 4H 643 on panel 23-214. (Ref. Fig. 411)

(a) On diode board, unsolder the diode to be removed.

<u>CAUTION</u> : BEFORE UNSOLDERING THE DIODE, PROTECT THE CABLES AND EQUIPMENT TO PREVENT DAMAGE BY DROPS OF SOLDER.

D. Preparation of Replacement Component

(1) Components in unit 7-123, 8-123, 11-123, 14-123, 17-123.

(a) If necessary, cut the right length of terminal wires.

(b) At diode input, crimp a dia. 4 terminal lug ; at diode output, crimp a dia. 6 terminal lug.

(c) At the other diode output, crimp a dia. 6 terminal lug.

(2) Preparation of Replacement Component for Panels 2-214 and 23-214.

(a) If necessary, cut the right length of terminal wires.

D. Install

(1) Diodes in unit 7-123, 8-123, 11-123, 14-123, 17-123.
(Ref. Fig. 405, 406 and 407)
(Ref. Fig.408 and 409)

(a) Install the diode terminal lug assembly.

(b) Install washers (5) and (7) ; screw nuts (6) and (8).

(c) Install protective plate (4), washers and the 4 attachment screws.

(d) Install cables on top of unit ; tighten screw securing clamps (3).

(e) Install unit in its housing ; install fasteners (2) ; tighten knurled nuts (1).

(2) Diodes 1 to 4H 706 on panel 2-214
(Ref. Fig. 410)

(a) Solder diode to terminals ; respect the polarity.
- Diode input to terminal 1.
- Diode output to terminal 2.

CAUTION : BEFORE SOLDERING THE DIODES, PROTECT THE CABLES AND EQUIPMENT TO PREVENT DAMAGE BY DROPS OF SOLDER.

(b) Install protective plate (2) ; install washers and screws (1).

(3) Remove diodes 1 to 4H 640, 1 to 4H 641, 1 to 4H 642, 1 to 4H 643 from panel 23-214.
(Ref. Fig. 411)

(a) Solder diode to terminals ; respect the polarity.
- Diode input to terminal 1.
- Diode output to terminal 2.

CAUTION : BEFORE SOLDERING THE DIODES PROTECT THE CABLES AND EQUIPMENT TO PREVENT DAMAGE BY DROPS OF SOLDER.

E. Close-Up

(1) Components in unit 7-123, 8-123, 11-123, 14-123, 17-123

(a) In zone 123, close access door 123AB or 122BB.

Remove access platform.

(b) According to the component removed, remove safety clip and tag and reset the circuit breaker tripped in paragraph B (2).

(2) Diodes 1 to 4H 706 on panel 2-214

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(a) In flight compartment, close access door 2-214

(b) According to the diode removed, remove safety clip and tag and reset the circuit breaker tripped in paragraph B (2).

(3) Diodes 1 to 4H 640, 1 to 4H 641, 1 to 4H 642, 1 to 4H 643 on panel 23-214.

(a) Install protective plate on unit, screw attachment screws.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(b) Connect electrical plugs to sockets on unit (identifiers must correspond).

(c) Install unit in its housing ; lock quick-release fasteners.

F. Test

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(2) Check that the replaced components operate correctly by carrying out the corresponding test procedure.

6. Relays

A. Equipment and Materials

DESCRIPTION	PART NO.
Access platform 10.7 ft. (3.22 m)	

B. Prepare

(1) De-energize the aircraft electrical network and dis-connect electrical ground power unit (Ref. 24-41-00, Servicing).

IDENTIFIER	CORRESPONDING CIRCUIT BREAKER			
	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
1H 614	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-123	1H 612	D11
1H 618	ENG1 B VALVE CONT OVER PRESS IND	1-123	1H 611	D10
1H 619	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-123	1H 612	D11
1H 620	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-123	1H 612	D11
1H 621	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-123	1H 612	D11
1H 622	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-123	1H 612	D11
1H 623	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-123	1H 612	D11
1H 661	ENG1 B VALVE CONT OVER PRESS IND	1-213	1H 611	D10
1H 664	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
1H 666	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
1H 668	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
1H 676	GRP1 AIR GEN CONT & IND	1-213	1H 862	D13
1H 682	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
1H 686	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11

R

	IDENTIFIER	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R		CORRESPONDING CIRCUIT BREAKER			
R	1H 687	GRP1 FUSELAGE ENTRY SAFETY VALVE SUP	1-213	1H 680	D12
R	1H 694	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
R	1H 695	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
R	1H 696	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
R	1H 697	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
R	1H 707	GRP1 FUSELAGE ENTRY SAFETY VALVE SUP	1-213	1H 680	E12
R	1H 712	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
R	1H 871	GRP1 AIR GEN CONT & IND	1-213	1H 682	D13
R	1H 872	GRP1 AIR GEN CONT & IND	1-213	1H 682	D13
R	1H 901	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
R	1H 902	GRP1 AIR COND VALVE CLOSE AIR GEN IND	1-213	1H 612	D11
R	1H 906	GRP1 AIR GEN COND & IND	1-213	1H 862	D13
R	1H 910	GRP1 AIR GEN COND & IND	1-213	1H 862	D13
R	2H 614	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
R	2H 618	ENG2 B VALVE CONT OVER PRESS IND	5-213	2H 611	A 8
R	2H 619	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
R	2H 620	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
R	2H 621	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
R	2H 622	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
R	2H 623	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
R	2H 661	ENG2 B VALVE CONT OVER PRESS IND	5-213	2H 611	A 8
R	2H 664	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
R	2H 666	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9

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IDENTIFIER	CORRESPONDING CIRCUIT BREAKER			
	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
2H 668	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H 676	GRP2 AIR GEN CONT & IND	5-213	2H 862	F 9
2H 682	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H 686	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H 687	GRP2 FUSELAGE ENTRY SAFETY VALVE SUP	5-213	2H 680	E10
2H 694	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H 695	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H 696	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H 697	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H 707	GRP2 FUSELAGE ENTRY SAFETY VALVE SUP	5-213	2H 680	E10
2H 712	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H 871	GRP2 AIR GEN CONT & IND	5-213	2H 862	F 9
2H 872	GRP2 AIR GEN CONT & IND	5-213	2H 862	F 9
2H 901	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H 902	GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
2H 906	GRP2 AIR GEN CONT & IND	5-213	2H 862	F 9
2H 910	GRP2 AIR GEN CONT & IND	5-213	2H 862	F 9
3H 614	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H 618	ENG3 B VALVE CONT OVER PRESS IND	15-215	3H 611	A 4
3H 619	GRP3 AIR CONT VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H 620	GRP3 AIR CONT VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H 621	GRP3 AIR CONT VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H 622	GRP3 AIR CONT VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H 623	GRP3 AIR CONT VALVE	15-215	3H 612	A 3

IDENTIFIER	CORRESPONDING CIRCUIT BREAKER			
	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
	CLOSE AIR GEN IND			
3H 661	ENG3 B VALVE CONT OVER PRESS IND	15-215	3H 611	A 4
3H 664	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H 666	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H 668	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H 676	GRP3 AIR GEN CONT & IND	15-215	3H 862	B 3
3H 682	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H 686	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H 687	GRP3 FUSELAGE ENTRY SAFETY VALVE SUP	15-215	3H 680	F 3
3H 694	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H 695	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H 696	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H 697	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H 707	GRP3 FUSELAGE ENTRY SAFETY VALVE SUP	15-215	3H 680	F 3
3H 712	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H 871	GRP3 AIR GEN CONT & IND	15-215	3H 862	B 3
3H 872	GRP3 AIR GEN CONT & IND	15-215	3H 862	B 3
3H 901	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H 902	GRP3 AIR COND VALVE CLOSE AIR GEN IND	15-215	3H 612	A 3
3H 903	GRP3 AIR GEN CONT & IND	15-215	3H 862	B 3
3H 906	GRP3 AIR GEN CONT & IND	15-215	3H 862	B 3
3H 910	GRP3 AIR GEN CONT & IND	15-215	3H 862	B 3
4H 614	GRP4 COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H 618	ENG4 B VALVE CONT OVER PRESS IND	15-216	4H 611	A23
4H 619	GRP4 AIR COND VALVE	15-216	4H 612	A24

IDENTIFIER	CORRESPONDING CIRCUIT BREAKER			
	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
	CLOSE AIR GEN IND			
4H 620	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H 621	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H 622	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H 623	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H 661	ENG4 B VALVE CONT OVER PRESS IND	15-216	4H 611	A23
4H 664	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H 666	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H 668	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24
4H 676	GRP4 AIR GEN CONT & IND	15-216	4H 862	B23
4H 682	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A23
4H 686	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A23
4H 687	GRP4 FUSELAGE ENTRY SAFETY VALVE SUP	15-216	4H 680	F25
4H 694	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A23
4H 695	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A23
4H 696	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A23
4H 697	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A23
4H 707	GRP4 FUSELAGE ENTRY SAFETY VALVE SUP	15-216	4H 680	F25
4H 712	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A23
4H 871	GRP4 AIR GEN CONT & IND	15-216	4H 862	B23
4H 872	GRP4 AIR GEN CONT & IND	15-216	4H 862	B23
4H 901	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A23
4H 902	GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A23
4H 903	GRP4 AIR GEN CONT & IND	15-216	4H 862	B23

R

IDENTIFIER	CORRESPONDING CIRCUIT BREAKER			
	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
4H 906	GRP4 AIR GEN CONT & IND	15-216	4H 862	B23
4H 910	GRP4 AIR GEN CONT & IND	15-216	4H 862	B23

(3) Location of relays
(Ref. Fig. 405, 406 and 407)
(Ref. Fig. 408, 409 and 410)
(Ref. Fig. 411)

IDENTIFIER	DESCRIPTION	LOCATION
1 and 2H 614	RLY FAULT SHUT DOWN ENG 1 - 2	14-123
3 and 4H 614	RLY FAULT SHUT DOWN ENG 3 - 4	17-123
1 and 2H 618	RLY FAULT SAFETY "A"	7-123
3 and 4H 618	RLY FAULT SAFETY "A"	8-123
1 and 2H 619	RLY FAULT TEST ENG 1 - 2	14-123
3 and 4H 619	RLY FAULT TEST ENG 3 - 4	17-123
1 and 2H 620	RLY CIRCUIT FAULT ENG 1 - 2	14-123
3 and 4H 620	RLY CIRCUIT FAULT ENG 1 - 2	17-123
1 and 2H 621	RLY EXCHANGE O/HEAT WARNING ENG 1 - 2	14-123
3 and 4H 621	RLY EXCHANGE O/HEAT WARNING ENG 1 - 2	17-123
1 and 2H 622	RLY FAULT	14-123
3 and 4H 622	RLY FAULT	17-123
1 and 2H 623	RLY FAULT COLD AIR UNIT OUTLET O/HEAT - O/PRESS	14-123
3 and 4H 623	RLY FAULT COLD AIR UNIT OUTLET O/HEAT - O/PRESS	17-123

IDENTIFIER	DESCRIPTION	LOCATION
1 and 2H 661	RLY DUAL PRESS REDUCING SHUT OFF	14-123
3 and 4H 661	RLY DUAL PRESS REDUCING SHUT OFF	17-123
1 and 2H 664	RLY FUEL PUMP MAIN	14-123
3 and 4H 664	RLY FUEL PUMP MAIN	17-123
1 and 2H 666	RLY FUEL PUMP STBY 2	14-123
3 and 4H 666	RLY FUEL PUMP STBY 2	17-123
1 and 2H 668	RLY SAFETY ENG 1 - 2	14-123
3 and 4H 668	RLY SAFETY ENG 3 - 4	17-123
1 and 2H 676	RLY TEST	14-123
3 and 4H 676	RLY TEST	17-123
1 and 2H 682	RLY SAFETY VALVE CONTROL AND SHUT OFF ENGINE	7-123
3 and 4H 682	RLY SAFETY VALVE CONTROL AND SHUT OFF ENGINE	8-123
1 and 2H 686	RLY O/HEAT LATCH	7-123
3 and 4H 686	RLY O/HEAT LATCH	8-123
1 and 2H 687	RELAY FAULT	7-123
3 and 4H 687	RELAY FAULT	8-123
1 and 2H 694	RELAY TEST SMOKE	11-123
3 and 4H 694	RELAY TEST SMOKE	11-123
1 and 2H 695	RLY INHIB	11-123
3 and 4H 695	RLY INHIB	11-123
1 and 2H 696	RLY SMOKE	11-123
3 and 4H 696	RLY SMOKE	11-123
1 and 2H 697	RLY TEST FAULT	11-123

nuts (1) and remove fasteners (2).

(2) Remove cables from the top of unit (2 quick-release fasteners securing each clamp (3)).

(3) Pull unit forward in order to gain access to relay to be removed.

(4) Unscrew nuts (9) from relay ; retain washers (10).

(5) Slightly pull relay to remove it.

D. Install

(1) Install relay on its support ; install washers (10) ; screw nut (9).

(2) Install cables on top of unit ; tighten screws securing clamp (3).

(3) Install unit in its housing, install fasteners (2) ; tighten knurled nuts (1).

E. Close-Up

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(1) In zone 123, close access doors 123AB or 123BB ; remove access platform.

(2) Remove safety clip and tag and reset the circuit breaker tripped in paragraph B (2).

F. Test

(1) Check that the replaced component operates correctly by carrying out the test procedure.

R B 7. Duct Clamps

R B WARNING: HOT AIR LEAKS FROM A BADLY FITTED CLAMP IN THE ENGINE
R B BAY CAN CAUSE AN ENGINE FIRE WARNING.

R B A. Before fitting.

R B (1) Ensure duct flanges are aligned and square.

R B (a) Spigoted seats - ensure spigot will fit inside
R B recess.

RB (b) Spherical seats - ensure flanges are concentric
RB within 0.075 ins.

RB (2) Ensure seat fits squarely in recess.

RB (3) Check clamp (post mod 21C100 AVICA CLAMPS):

RB (a) Fail safe link is positively retained by pips on
RB the end of the upper clamp lugs.
RB (b) Stiff nut minimum running torque, with bolt thread
RB lubricated with engine oil, 6lbs ins. If less
RB replace with P/N AS20626 or LH3417-054.
RB (c) Fail safe links for cracks.
RB (d) Links and bolt for freedom of movement.

RB B. On assembly (post mod 21C100 AVICA CLAMPS) ensure:

RB (1) Bolt is firmly seated in clamp claw.

RB (2) Clamp lug pips are in fail safe link cut-out.
RB Lightly tap clamp around periphery to ensure full
RB seating.

RB C. Torque tighten stiff-nut Post Mod 21C100 AVICA CLAMPS to
RB 120 lbs ins. If nut bottoms on bolt thread or safety link
RB slot bottoms on its retainer, change the clamp.

COMPRESSION - ADJUSTMENT/TEST

1. General

2. Operational Tests - Indicator Light Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	

B. Prepare

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, S).

(2) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
MWS SUP 1	1-213	W 252	N21
AUDIO WARN SYS SUP 1		W 371	M21
ENG 1 AND WING/NAG O/ HEAT SYS SUP		W 128	Q21
ENG 1 B/VALVE CONT AND OVER PRESS IND		1H 611	D10
GRP 1 AIR COND VALVE CLOSE AND AIR GEN IND		1H 612	D11
GRP 1 ENTRY SAFETY VALVE SUP		1H 680	E12
ENG 2 SHUT DOWN CONT		2K 253	D 1
ENG 3 SHUT DOWN CONT		3K 253	D 2
GRP 1 FUEL VALVE CONTROL	2-213	1H 863	D16
GRP 3 FUEL VALVE CONT		3H 863	F16
GRP 1 TEMP SELECTOR AUTO SUP AND CONT		H1000	B17
GRP 3 TEMP SELECTOR AUTO SUP AND CONT		H1002	G16
ENG 1 SHUT DOWN CONT	3-213	1K 253	F 3
ENG 4 SHUT DOWN CONT		4K 253	F 4
GRP 2 TEMP SELECTOR AUTO	4-213	H1001	E11

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SUP AND CONT			
GRP 4 TEMP SELECTOR AUTO		H1003	B12
SUP AND CONT			
GRP 2 FUEL VALVE CONT		2H 863	E12
GRP 4 FUEL VALVE CONT		4H 863	B11
MWS SUP 2	5-213	W 251	D15
AUDIO WARN SYS SUP 2		W 372	C17
ENG 2 AND 3 WING/NAC O/ HEAT SYS SUP		W 129	D18
ENG 2 B/VALVE CONT AND OVER PRESS IND		2H 611	A 8
GRP 2 AIR COND VALVE CLOSE AND AIR GEN IND		2H 612	A 9
GRP 2 FUSELAGE ENTRY SAFETY VALVE SUP		2H 680	E10
ENG 3 B/VALVE CONT AND OVER PRESS IND	15-215	3H 611	A 4
GRP 3 AIR COND VALVE CLOSE AND AIR GEN IND		3H 612	A 3
GRP 3 FUSELAGE ENTRY SAFETY VALVE SUP		3H 680	F 3
3CM STN CTR LT TEST SUP		L1005	D13
ENG 4 B/VALVE CONT AND OVER PRESS IND	15-216	4H 611	A23
GR 4 AIR COND VALVE CLOSE AND AIR GEN IND		4H 612	A24
GR 4 FUSELAGE ENTRY SAFETY VALVE SUP		4H 680	F25
3CM STN LH LT TEST SUP 1		L1003	C12

R (3) Check before beginning test

(a) Place the following switches and selector switches in the configuration indicated below :

On panel 2-214 :
BLEED VALVES (4) 1 to 4H613 in SHUT position.
COND VALVE (4) 1 to 4H866 in OFF position.
R FUEL VALVE (4) 1 to 4H867 in AUTO position.

(b) On panel 23-214

AIR COND TEST H648 in OFF position
A/C TEST H647 in OFF position.

(c) On centre console, the 4 throttle levers are in normal idle position.

(d) On panel 28-214

AIR GENERATION H699 in NORM position.

(e) On panel 4-211, engine 1 (2 - 3 - 4) fire control handle must be completely pushed up.

(f) On panel 2-214, all AIR BLEED control and TEMPERATURE CONTROL indicator lights must be off.

(g) On panel 1-214, the 4 NAC/WING O/HEAT indicator light must be off.

3. Operational Tests of Warning Indicators

A. OVER PRESS Warning

(1) On temperature control panel 2-214

Place BLEED VALVE switch in OPEN position 1 (2 - 3 - 4) H613.

Press OVER PRESS indicator light 1 (2, 3, 4) H624, OVER PRESS indicator light and AIR warning light illuminate; gong sounds.

(2) Release OVER PRESS indicator light
OVER PRESS indicator light and AIR warning light go off.

(3) Place BLEED VALVE switch in SHUT position.

B. PRIM EXCH OVER-HEAT and MASTER WARNING Channel 1 Test

(1) On panel 2-214 place the 4 COND VALVE 1 (2, 3, 4) H866 switch in ON position.

(2) On panel 23-214 place A/C test H647 switch in test position.

(3) On panel 2-214, all indicators of AIR BLEED CONTROL compartments must remain off.

(4) Pressurize Fuel System

WARNING : OBSERVE FUEL SYSTEM SAFETY PRECAUTIONS DESCRIBED IN 28-00-00 AND 28-10-00.

NOTE : Pressurization assumes a minimum quantity of fuel of 2500 kg in the appropriate feed tank (1, 2, 3, 4).
On centre console, place throttle control levers in SHUT position (lower mechanical stop).
Check that crossfeed valves are closed and that associated magnetic indicators display vertical stripes.
With the LP VALVE switch locked at OPEN by the switch guard, check that the associated magnetic indicator shows an in-line indication.
Place the first of the three ENGINE FEED PUMPS control switches in ON position (MAIN PUMP).
Engine 1 Main Fuel Pump for group 1
Engine 2 Main Fuel Pump for group 2
Engine 3 Main Fuel Pump for group 3

R Engine 4 Main Fuel Pump for group 4
R Check that corresponding LOW PRESS indicator
R light goes off when pump operating pressure is
R reached.

R WARNING : FUEL SYSTEM MUST NOT OPERATE MORE THAN 2
R HOURS.

R In case Fuel System cannot be used.

R Trip, safety and tag the following circuit breakers :

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R R	For GRP 1 LH.UC WEIGHT SW A SYS SUP	1-213	G 292	M17
R R	For GRP 2 LH.UC WEIGHT SW B SYS SUP	3-213	G 293	B 8
R R	For GRP 3 RH.UC WEIGHT SW B SYS SUP	3-213	G 294	B 9
R R	For GRP 4 RH.UC WEIGHT SW A SYS SUP	1-213	G 295	M18

R WARNING : DURING TEST, FUEL EXCH WARNING LIGHT MAY
R ILLUMINATE. ON PANEL 2-214 PLACE FUEL VALVE
R SWITCH IN OPEN POSITION (SELF-HOLDING CANCEL-
R LATION).

(5) - On panel 23-214, place AIR COND TEST H648 switch in PRIM position.

R - On panel 2-214, the 4 PRIM EXCH 1, 2, 3, 4 H626 indi-
R cator lights must illuminate.
R (No change for the other indicator lights).

R - On panel 4-211, Master Warning Panel W254, AIR indicator light must illuminate.

- Gong must sound.

(6) - On panel 23-214 place AIR COND TEST H648 switch in position after PRIM.

R - On panel 2-214 the 4 PRIM EXCH 1, 2, 3, 4H626 indi-
R cator lights must go off.

- On panel 4-211, Master Warning Panel W254, AIR warning light must go off.

R C. SEC EXCH OVER-HEAT and MASTER WARNING Channel 2 Test

(1) - On panel 23-214, place AIR COND Test H648 switch in SEC position.

- On panel 2-214, the 4 SEC EXCH 1 (2, 3, 4) H627 indicator lights must illuminate.
(No change for the other indicator lights).

- On panel 4-211, Master Warning Panel W254, AIR indicator light must illuminate.

- Gong must sound.

(2) - On panel 23-214, place AIR COND TEST H648 switch in position after SEC.

- On panel 2-214, the 4 SEC EXCH 1, 2, 3, 4H627 indicator lights must go off.

- On panel 4-211, Master Warning Panel W254, AIR indicator light must go off.

D. Fuel Overheat Test

(1) - On panel 23-214, place AIR COND TEST switch H648 in FUEL position.

- On panel 2-214, the 4 FUEL EXCH 1, 2, 3, 4H628 indicator lights must illuminate.
(No change of the other indicator lights and on the Master Warning Panel).

(2) - On panel 23-214, place AIR COND TEST H648 switch in position after FUEL.

- On panel 2-214, the 4 FUEL EXCH 1, 2, 3, 4H628 indicator lights must go off.

E. DUCT 1 Overheat and Master Warning Channel 3 Test

(1) - On panel 23-214, place AIR COND TEST H648 switch in DUCT 1 position.

- On panel 2-214, the 4 DUCT 1, 2, 3, 4H629 indicator lights must illuminate.
(No change of the other indicator lights).

- On panel 4-211, Master Warning Panel W254, AIR warning light must illuminate.
- Gong must sound.

(2) - On panel 23-214, place AIR COND TEST H643 switch in position after DUCT 1.
- On panel 2-214, the 4 DUCT 1, 2, 3, 4H629 indicator lights must go off.
- On panel 4-211, Master Warning Panel W254, AIR indicator light must go off.

F. DUCT 2 Overheat and Master Warning Channel 4 Test

(1) - On panel 23-214, place AIR COND TEST H648 switch in DUCT 2 position.
- On panel 2-214, the 4 DUCT 1, 2, 3, 4H629 indicator lights must illuminate.
- On panel 4-211, Master Warning Panel W254, AIR indicator light must illuminate.
- Gong must sound.

(2) - On panel 23-214, place AIR COND TEST 1 (2, 3, 4) H648
R switch in after DUCT 2 position.
- On panel 2-214, the 4 DUCT 1 (2, 3, 4) H629 indicator lights must go off.
- On panel 4-211, Master Warning Panel W254, AIR warning light must go off.

(3) - On panel 23-214, place AIR COND TEST H648 switch in the following OFF position then in OFF position before PRIM (no change).

(4) - Place back AIR COND TEST H648 switch in OFF position between DUCT 2 and FLOW 1 positions.

(5) - On panel 23-214, place A/C TEST H647 switch in OFF position.

(6) - On panel 2-214, place the 4 COND VALVE 1 (2, 3, 4) H866 switches in OFF position.

G. DUCT Indicator Light Test

(1) On panel 2-214, press DUCT indicator light until it illuminates (approximately 3 seconds ± 2 seconds).

Illumination of AIR warning light on Master Warning panel and gong sounds.

(2) Release DUCT indicator light, wait for 3 seconds ± 2 seconds :

DUCT indicator light goes off - AIR warning light goes off.

H. Close-Up

R (1) In case the Fuel system has been pressurized.

R Place ENGINE FEED PUMP switch in OFF position. After
R a few seconds the corresponding LOW PRESS indicator
R light must illuminate.

R If necessary, remove safety clip and tag and reset
R circuit breaker tripped in paragraph 3.B.(4).
R If FUEL EXCH warning has come on during test after
R switching off the ground air supply unit, wait for
R cancellation of warning and place FUEL VALVE switch
R in AUTO position.

R (2) De-energize the aircraft electrical network.

R (3) Disconnect electrical ground power unit.

4. <u>PRIM EXCH Warning Functional Test</u>

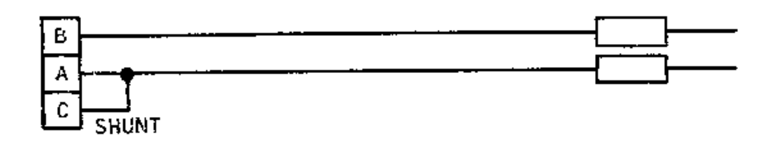
A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Test Connector	
Decade Box	

B. Prepare (Ref. Fig. 501)

(1) - In zone 415 for GR 1 (426, 435, 446) disconnect the primary heat exchanger overheat detector 1 (2, 3, 4) H654 receptacle.

R - On receptacle 1H654, aircraft side, connect a 3 pin test connector.



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Test Connector
Figure 501

Connect the two test connector output wires to a decade box, display 100 ohms.

R (2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, S).

R (3) Pressurize the fuel system (Ref. paragraph 3.B.(4)).

R (4) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
MWS SUP 1	1-213	W 252	N21
AUDIO WARN SYS SUP 1		W 371	M21
ENG 1 AND WING/NAG O/HEAT SYS SUP		W 128	Q21

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 1 B/VALVE CONT AND OVER PRESS IND		1H 611	D10
GRP 1 AIR COND VALVE CLOSE AND AIR GEN IND		1H 612	D11
GRP 1 ENTRY SAFETY VALVE SUP		±1H 680	E12
ENG 2 SHUT DOWN CONT		2K 253	D 1
ENG 3 SHUT DOWN CONT		3K 253	D 2
GRP 1 FUEL VALVE CONTROL	2-213	1H 863	D16
GRP 3 FUEL VALVE CONT		3H 863	F16
GRP 1 TEMP SELECTOR AUTO SUP AND CONT		H1000	B17
GRP 3 TEMP SELECTOR AUTO SUP AND CONT		H1002	G16
ENG 1 SHUT DOWN CONT	3-213	1K 253	F 3
ENG 4 SHUT DOWN CONT		4K 253	F 4
GRP 2 TEMP SELECTOR AUTO SUP AND CONT	4-213	H1001	E11
GRP 4 TEMP SELECTOR AUTO SUP AND CONT		H1003	B12
GRP 2 FUEL VALVE CONT		2H 863	E12
GRP 4 FUEL VALVE CONT		4H 863	B11
MWS SUP 2	5-213	W 251	D15
AUDIO WARN SYS SUP 2		W 372	C17
ENG 2 AND 3 WING/NAC O/HEAT SYS SUP		W 129	D18
ENG 2 B/VALVE CONT AND OVER PRESS IND		2H 611	A 8
GRP 2 AIR COND VALVE CLOSE AND AIR GEN IND		2H 612	A 9
GRP 2 FUSELAGE ENTRY SAFETY VALVE SUP		2H 680	E10
ENG 3 B/VALVE CONT AND OVER PRESS IND	15-215	3H 611	A 4
GRP 3 AIR COND VALVE CLOSE AND AIR GEN IND		3H 612	A 3
GRP 3 FUSELAGE ENTRY SAFETY VALVE SUP		3H 680	F 3
3CM STN CTR LT TEST SUP		L1005	D13
ENG 4 B/VALVE CONT AND	15-216	4H 611	A23

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
OVER PRESS IND GRP 4 AIR COND VALVE		4H 612	A24
CLOSE AND AIR GEN IND GR 4 FUSELAGE ENTRY		4H 680	F25
SAFETY VALVE SUP 3CM STN LH LT TEST SUP 1		L1003	C12

C. Tests

(1) On panel 2-214, place COND VALVE switch in ON position.

On the decade resistance box, slowly increase resistance.

(2) For a display value R included between 181,5 and 185 ohms, on panel 2-214 the PRIM EXCH 1 (2, 3, 4) H626 indicator light must illuminate.

On panel 4-211, Master Warning Panel W254, AIR warning light must illuminate.

(3) Gong must sound.

(4) On panel 2-214, place COND VALVE 1 (2, 3, 4) H866 switch in OFF position.

(5) On panel 4-211, Master Warning Panel W254, AIR warning light must go off.

(6) On panel 2-214 PRIM EXCH indicator light must remain illuminated.

(7) Reduce resistance on decade box.

(8) On panel 2-214, PRIM EXCH indicator light must go off.

(9) Remove test equipment connector from A/C connector.

(10) Connect connector 1H654 on primary heat exchanger overheat detector.

R (11) During the time connectors are switched over, PRIM EXCH warning light illuminates then goes off when connector is connected.

D. Close-Up

R - Set fuel system in its previous state (Ref. paragraph
R 3.H.(1)).
- De-energize the aircraft electrical network and remove electrical ground power unit.

5. SECOND EXCH Warning Functional Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Test Connector	
Decade Box	

B. Prepare

(1) Check that circuit breakers listed in paragraph 4. B. (4) are set.

(2) In zone 234 for the GR 1 (533, 633, 634) open door AT (BT, BT, AT) and disconnect secondary heat exchanger overheat detector connector 1 (2, 3, 4) H655A.

(3) On receptacle 1H655A, aircraft wiring side, connect a 3 pin test connector similar to that described in paragraph 4. B. (1).

(4) Connect the two test connector output wires on a decade box, select a resistance of 100 ohms approximately.

R (5) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, S).

R (6) Pressurize the fuel system (Ref. paragraph 3.B.(4)).

C. Test

(1) On panel 2-214, AIR BLEED CONTROL, place COND VALVE switch in ON position. On decade resistance box, slowly increase resistance.

(2) For a selected value R included between 178 ohms and 181 ohms.

(3) On panel 2-214, SEC EXCH 1 (2, 3, 4) H627 indicator light must illuminate.

(4) On panel 4-211, Master Warning Panel W254, AIR indicator light must illuminate. Gong must sound.

(5) On panel 2-214 place COND VALVE 1 (2, 3, 4) H866 switch

in OFF position.

(6) On panel 4-211, Master Warning Panel W254, AIR indicator light must go off. On panel 2-214 SEC EXCH indicator light must remain illuminated.

(7) Reduce resistance on decade box.

On panel 2-214, SEC EXCH indicator light must go off.

(8) On aircraft receptacle 1 (2, 3, 4) H655 disconnect test connector.

On panel 2-214, SEC EXCH indicator light must illuminate.

(9) Connect aircraft receptacle to corresponding detector 1 (2, 3, 4) H655A on detector 1 (2, 3, 4) H655.

On panel 2-214 SEC EXCH indicator light must go off.

D. Close-Up

(1) Set fuel system in its previous state (Ref. paragraph 3.H.(1)).

(2) De-energize the aircraft electrical network and disconnect electrical ground power unit.

(3) Close doors opened at the beginning of test in paragraph 5. B. (2).

6. FUEL EXCH Warning Functional Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Test Connector	
Decade Box	

B. Prepare

(1) Check that circuit breakers mentioned in paragraph
R 4. B (4) are set.

R (2) In zone 534 for the GR 1 (533, 633, 634) open door
R AT (BT, BT, AT) and disconnect turbine inlet excessive temperature detector connector 1 (2, 3, 4) H656.

(3) On receptacle 1H656A, aircraft wiring side, connect a 3 pin test connector similar to that described in paragraph 4. B. (1).

(4) Connect the two test connector output wires on a decade box ; display 100 ohms approximately.

R (5) Connect electrical ground power unit and energize the aircraft electrical network (24-41-00, S).

(6) On panel 2-214 FUEL VALVE switch 1H867 must be in AUTO position.

C. Tests

(1) On decade box, slowly increase resistance.
For a selected resistance R included between 134.5 and
R 138 ohms, FUEL EXCH indicator light 1 (2, 3, 4) H628 must illuminate.

If the fuel valve was closed, it must open. Check that FUEL VALVE indicator light 1H878 is in horizontal position.

R (2) On decade box, reduce resistance to 100 ohms, FUEL EXCH indicator light must remain illuminated.

(3) Place FUEL VALVE switch 1H867 in OPEN position FUEL

EXCH indicator light goes off.

(4) On receptacle 1H656A, wiring side, remove equipment connector. FUEL EXCH indicator light illuminates.

(5) Connect receptacle 1H656A on detector 1H656. FUEL EXCH indicator light goes off.

(6) Place FUEL VALVE switch 1H867 in AUTO position.

D. Close-Up

(1) De-energize the aircraft electrical network and
R disconnect electrical ground power unit.

(2) Close inspection door previously opened in paragraph 6. B. (2).

7. DUCT Warning Functional Tests

A. DUCT warning detection by fuel/heat exchanger overheat detector 1 (2, 3, 4) H657.

(1) Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Test Connector	
Decade Box	

(2) Prepare

(a) Check that circuit breakers mentioned in paragraph 4. B. (4) are set.

(b) In zone 534 for the GR1 (533, 633, 634) open door AT (BT, BT, AT) and disconnect receptacle 1 (2, 3, 4) H657A.

(c) On receptacle 1H657A, aircraft wiring side,
R connect a 3 pin test connector similar to that described in paragraph 4. B. (1).

(d) Connect the 2 test connector output wires on a decade box, display 100 ohms approximately.

R (e) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, S)

R (f) Pressurize the fuel system (Ref. paragraph
R 3.B.(4)).

(3) Tests

(a) On AIR BLEED CONTROL panel 2-214, place COND VALVE switch in ON position, on decade resistance box slowly increase resistance.

(b) For a display value R included between 144 ohms and 147 ohms.

On panel 2-214, DUCT indicator light 1 (2, 3, 4) H 629 must illuminate.

On panel 4-211, Master Warning Panel W254, AIR indicator light must illuminate.

Gong must sound.

(c) On panel 2-214, place COND VALVE switch in OFF position.

R On panel 4-211, Master Warning Panel W254, AIR indicator light must go off (no change on panel 2-214).

(d) On panel 2-214, place COND VALVE switch in ON position.

On panel 4-211, Master Warning Panel W254, AIR indicator light must illuminate ; gong must sound.

(e) On decade resistance box, reduce the selected resistance value to 100 ohms approximately. (No change on panel 2-214 and Master Warning Panel).

(f) On panel 2-214, place COND VALVE switch in OFF position then in ON position again.

On panel 2-214, DUCT indicator light must go off (when COND VALVE switch in position OFF).

On panel 4-211, Master Warning Panel W254, AIR indicator light must go off (when COND VALVE switch in position OFF).

(g) In zone 534, remove test connector from aircraft receptacle 1H657A ; DUCT indicator light illu-
R minates. Connect 1H657A receptacle to detector 1H657. DUCT indicator light goes off.

(h) Place back COND VALVE switch in OFF position.

(4) Close-Up

R (a) Set fuel system in its previous state (Ref.
R paragraph 3.H.(1)).

(b) De-energize the aircraft electrical network and
R disconnect electrical ground power unit.

R (c) Close aircraft door opened at the beginning of test in zone 534 for GR 1 (533, 633, 634) door AT (BT, BT, AT).

B. DUCT Warning Detection by Air Conditioning Overheat
R Detector 1 (2, 3, 4) H658

(1) Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Test Connector	
Decade Box	

(2) Prepare

(a) Check that circuit breakers mentioned in paragraph 4. B. (4) are set :

(b) In zone 535 for GR 1 (542, 642, 635) open inspection door AT (AT, AT, AT) and disconnect receptacle 1 (2, 3, 4) H658A.

(c) On receptacle 1H658A, aircraft wiring side, connect a 3 pin test connector similar to that described in paragraph 4. B. (1).

(d) Connect the two test connector output wires on a decade box, display 100 ohms approximately.

R (e) Connect electrical ground power unit and energize

the aircraft electrical network (24-41-00, S).

R (f) Pressurize the fuel system (Ref. paragraph
R 3.B.(4)).

(3) Tests

(a) Carry out operations effected in paragraph 7. A. (3) (a), in paragraph 7. A. (3) (f).

(b) In zone 535, remove test connector from aircraft receptacle 1H658A ; DUCT indicator light illuminates. Connect receptacle 1H658A on detector 1H658.
DUCT indicator light goes off.

(4) Close-up

R (a) Set fuel system in its previous state (Ref.
R paragraph 3.H.(1)).

(b) De-energize the aircraft electrical network and
R disconnect electrical ground power unit.

R (c) Close aircraft door opened at the beginning of test in zone 535 for GR 1 (542, 642, 635) door AT.

C. DUCT Warning Detection by Turbine Upstream Overpressure Pressure Switch 1 (2, 3, 4) H659

Ref. Tests 21-12-61.

8. <u>OVERPRESS Warning Functional Tests</u>

Ref. tests 21-11-16.

R COMPRESSION - AIR CONDITIONING DUCTS - APPROVED REPAIRS

R 1. Wing

R A. General

R Torn lagging cloth around fibreglass insulating the air conditioning ducts in LH and RH wing and zones 151, 152 results in loss of heat and fragmentation of fibreglass.

R B. Equipment and Materials

	DESCRIPTION	PART NO.
R	(1) Special Materials (Ref. 20-30-00, No.133)	
R	(2) Cleaning (Ref. 20-30-00, No.470)	
R	(3) Glues and Adhesives (Ref. 20-30-00, No.312)	
R	(4) Special Materials (Ref. 20-30-00, No.152)	
R	(5) Special Materials (Ref. 20-30-00, No.153)	

R C. Repair (Ref. Fig. 801)

R (1) Open the relevant access doors.

R (2) Replace fibreglass where necessary.

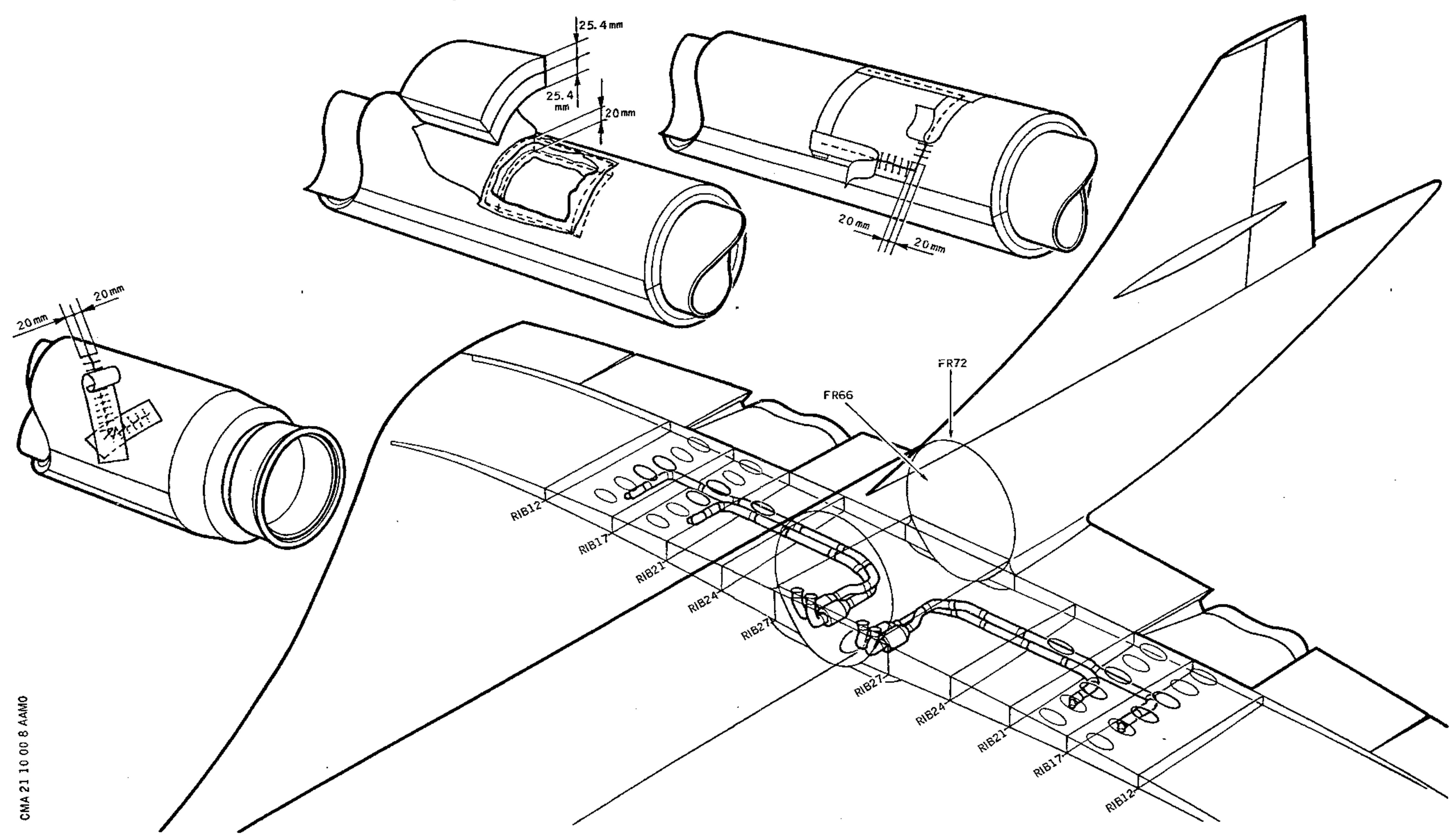
R (3) Cut out two pieces of fibreglass of the same dimensions as the non-insulated area in 25 mm (1.0 in.) thick fibreglass band, product No.152.

R (4) Install these two pieces on the non-insulated portion of duct.

R (5) Press fibreglass until thickness is 20 mm (0.787 in.) and cover with existing lagging cloth.

R (6) Sew torn cloth with thread : product No.133, so that tear ends come into contact (stitches in lagging cloth

INTENTIONALLY BLANK



Repair on Air Conditioning
Ducts in Wing
Figure 801

must be at 20 mm (0.707 in.) from the tear edge).

WARNING : THE ADHESIVE COMPOUND CONTAINS FLAMMABLE AND VOLATILE SOLVENT ; FOR THAT REASON, THE WORKING AREA MUST BE VERY WELL VENTILATED AND LIGHT SOURCES PROVIDED WITH A PROTECTION SYSTEM.

(7) Clean the tear edges with cleaning product No.470.

(8) Allow the product to dry and check that the surface is free from oil or grease.

(9) Prepare a patch of lagging cloth (Ref. 20-30-00, No.153) to cover the tear.

NOTE : Apply adhesive compound No.312 as per instructions described in 20-25-13.

(10) Apply a thin coat of adhesive compound on tear and on patch of lagging cloth.

(11) Wait until adhesive compound is dry : 10 to 15 mm approximately.

(12) Apply the patch of lagging cloth on tear and press so that the whole surface adheres correctly.

(13) If edges of patch do not adhere correctly or if, for any reason, this patch has to be removed :
- take off adhesive compound from contact surfaces (lagging cloth and patch),
- correctly clean surfaces and allow to dry.

(14) Apply adhesive compound again and repeat the repair procedure.

(15) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
Close access doors.

2. In Nacelles

RB A. Acceptable Damage

RB Fretting: On Duct. 10% of duct wall thickness.
RB Generally 0.12mm (0.005 inches)
RB On Gimbal. Acceptable provided gimbal
RB outer shell not holed or cracked.

RB Dent: 0.2 ins deep provided no cracking.

B. General

Repairs can be carried out on stainless steel and titanium (BST A21) air generation and starting welded ducts which are removed from the aircraft.

CAUTION : WELDING MUST NOT BE CARRIED OUT WHEN DUCTS ARE INSTALLED ON AIRCRAFT.

C. Titanium (BST A21) Ducts (Ref. Fig. 802)

WARNING : OPERATORS MUST WEAR WHITE COTTON GLOVES AT ALL TIMES.

(1) Examples 1 to 4 - Cut out the duct affected portion.

(2) Clean the surface by scratch brushing with a stainless steel brush.

(3) Prepare insert. Make certain that no gap between insert and duct exceeds 0.35 mm (0.015 in.).
Example 3 - A positioning tool shall be used to install the new end flange.

(4) Use argon gas (at least 99.95% pure) to both inside and outside of joint.

(5) Clean filler rod with stainless steel wire wool or grade 400 emery cloth.

(6) Insert shall be tack welded prior to final welding which must be carried out immediately after tacking.

(7) Example 3 = The new material and end fitting must be pickled prior to welding.

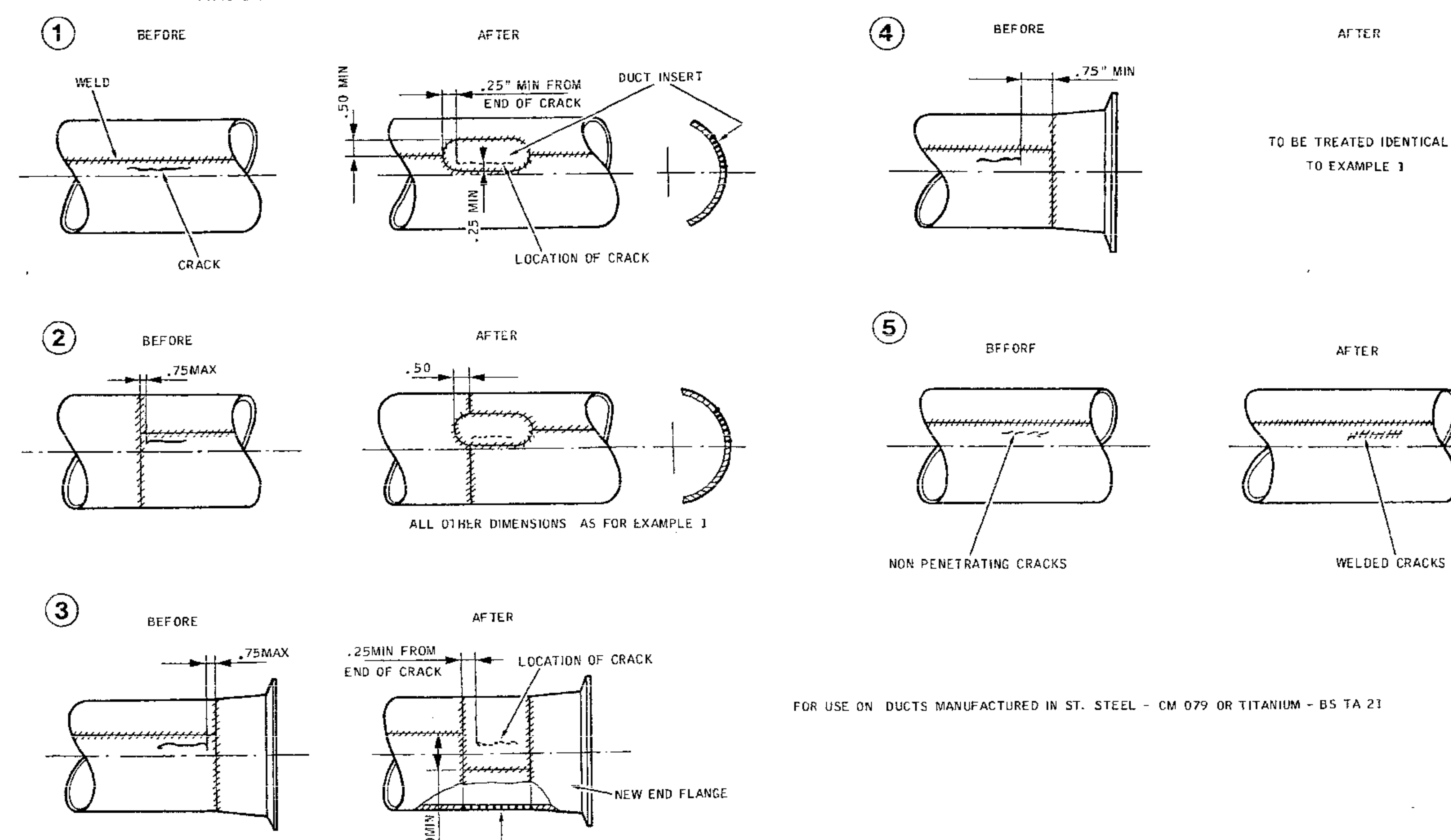
(8) Final Weld

CAUTION : SCRATCH BRUSHING AFTER WELDING MUST NOT BE CARRIED OUT PRIOR TO INSPECTION.

Example 5 = Grind out line of cracks until good metal is reached.
Scratch brush surface of duct and reweld as above whilst argon gas is supplied to inside and outside of duct.
Ensure full penetration of weld.

(9) Check

Check that :



R

Titanium (BST A21) and Stainless Steel Duct Repair
Figure 802

(a) Weld discolouration does not exceed a light straw colour with dark tram lines in the adjacent area.

(b) There is no reduction of material thickness.

(c) The weld shows no defect ; use X-ray or dye penetrant method.

(d) Pressure Test
Proof : 190 psi for one minute
Leak : 65 psi for 5 minutes without leakage.

D. Stainless Steel (CM079) Ducts

(1) Examples 1 to 4 = Cut out affected portion.

(2) Clean the surface by scratch brushing with stainless steel brush.

(3) Prepare insert. Make certain that no gap between insert and duct exceeds 0.7 mm (0.03 in.)
Example 3 = Use a positioning tool to install the new end flange.

(4) Use argon gas (at least 99.95% pure) to both inside and outside of joint.

(5) Clean filler rod with stainless steel wire wool. Spooled wire may be used straight from the spool without degreasing.

(6) Insert shall be tack welded prior to final welding which must be carried out immediately after tacking.
Example 3 = New material is to be pickled before welding.

(7) Clean welds by pickling or scratch brushing with a stainless steel brush.
Example 5 = Grind out line of cracks until good metal is reached.
Scratch brush surface of duct and reweld as above whilst argon gas is supplied to inside and outside of duct.

(8) Check

(a) Check for cracked welds or insufficient beads.

(b) Detect flaw using either X-ray or dye penetrant method.

(c) Pressure Test

Proof = 153 psi for one minute
Leak = 65 psi for 5 minutes without leakage.

(9) Fretting on gimbal outer shell.

(a) Clean the surface with stainless steel brush.
(b) Argon arc weld, using filler rod to BS2901 - 347S96 to fill fretted area without penetrating inside skin of shell.
(c) Dress back welded area to original contour.
(d) Dye penetrant crack check.

E. Air conditioning sensing pipes

Replacement pipes to the drawing number E84-4601 may be made from corrosion resisting steel tube to BST 67, 24 SWG or 26 SWG instead of BST 55.

(1) Procedure

(a) Use old pipe as template.

(b) Cut end fitting off old pipe, weld to new pipe.

(c) Identify the pipe by vibro-etching R.S. Number 41 446 on end nut.

(2) Check

(a) Pressure test to 80 PSI.G

PRESSURE AND FLOW LIMITING - DESCRIPTION AND OPERATION

1. General

A. Conditioning air is bled from the last stage of engine high pressure compressor.

B. The pressure and flow limiting system consists mainly of that portion of the air conditioning system located between the engine and the primary heat exchanger.

C. The pressure and flow limiting system is identical for the four air conditioning groups.
Only the component location is different.

R 2. Description (Ref. Fig. 001)

A. The air is bled from the engine and flows through :

(1) The non-return valve.

(2) The dual pressure reducing shut off valve (2 independent butterflies in the same body).

(3) The air conditioning valve.

(4) The mass flow control valve ; the air is then cooled in primary heat exchanger.

B. Control, indicating and safety of the system are provided by various components.

(1) A pressure relief valve, located downstream of dual pressure reducing shut off valve.

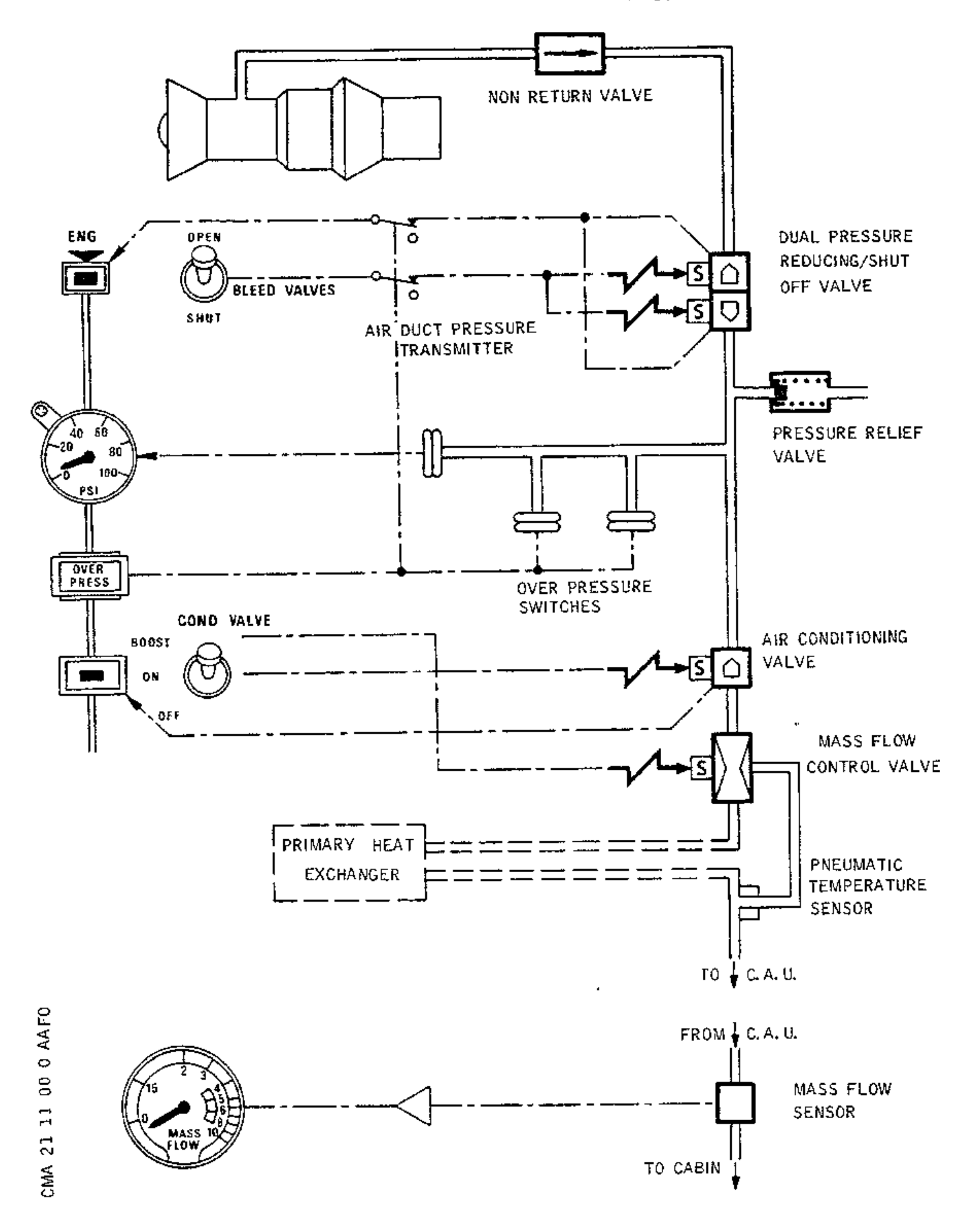
(2) A pneumatic temperature sensor located downstream of primary heat exchanger.

(3) A mass flow sensor located between water separator and cabin isolation valve.

(4) An air duct pressure transmitter and two overpressure switches located downstream of the pressure reducing shut off valve.

(5) Control switches, valve position magnetic indicators, conditioning air flow and pressure indicators.

These switches and indicators are located on Flight Engineer's panel 2-214.



Pressure and Flow Limiting - Schematic
Figure 001

R

3. Valve - Non-Return
(Ref. Fig. 002)

A. Description

(1) This valve is of the movable flap type. It consists mainly of :

(a) A body (1).

(b) Two movable flaps (2) linked to the body.

(2) The non-return valve is located on the air conditioning system inlet duct. It is attached to the engine. Its function is to avoid pressure drop in the system when it operates on the ground.

B. Operation

(1) During normal operation, the flaps are opened by the airflow supplying the air conditioning system.

(2) When the air is not flowing from the engine the flaps are closed by their own weight.

4. Valve - Dual Pressure Reducing Shut Off
(Ref. Fig.003 and 004)

A. Description

This valve consists of two entirely independent sections, located in the same body.

(1) Upstream section : shut off valve
(Ref. Fig.005 and 006)

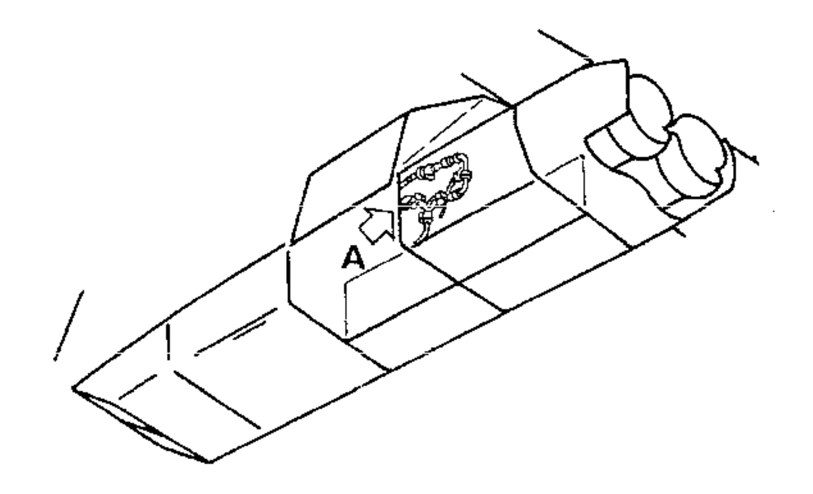
It is an electro-pneumatic shut off valve which can only rest in fully open or fully closed position.
It also has a non return function if the airflow direction is reversed.
It consists mainly of :

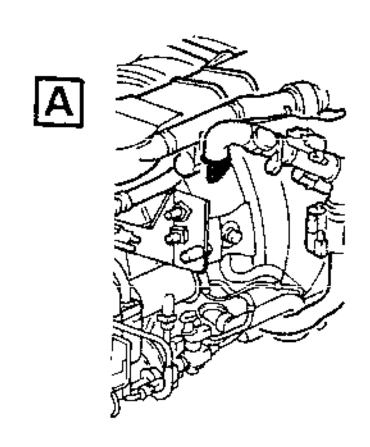
(a) A hollow cylindrical body.

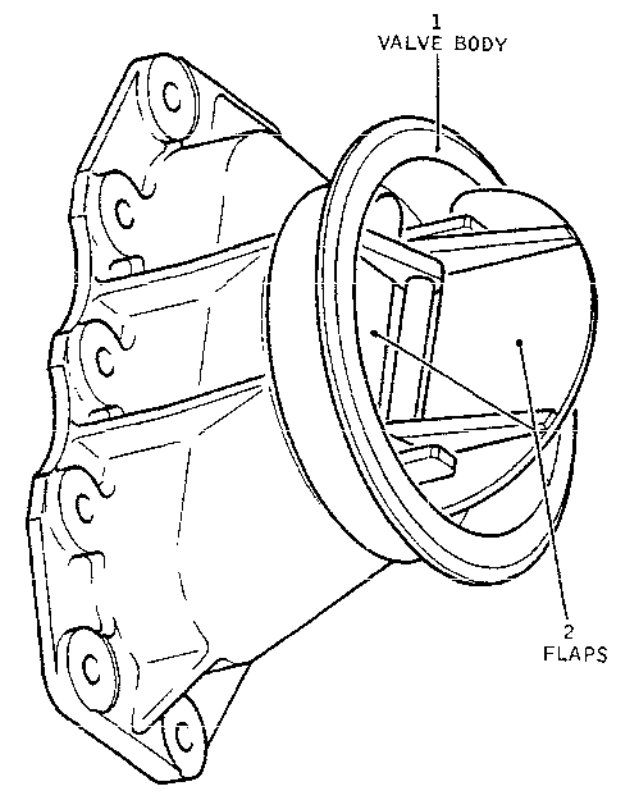
(b) A safety butterfly (4) mounted on a hinge pin.

(c) A cam (6) integral with the hinge pin which operates the end-of-travel microswitches (5 and 7)

(d) A piston (9) moving inside a cylinder, operates butterfly (4) and separates chambers A and B.

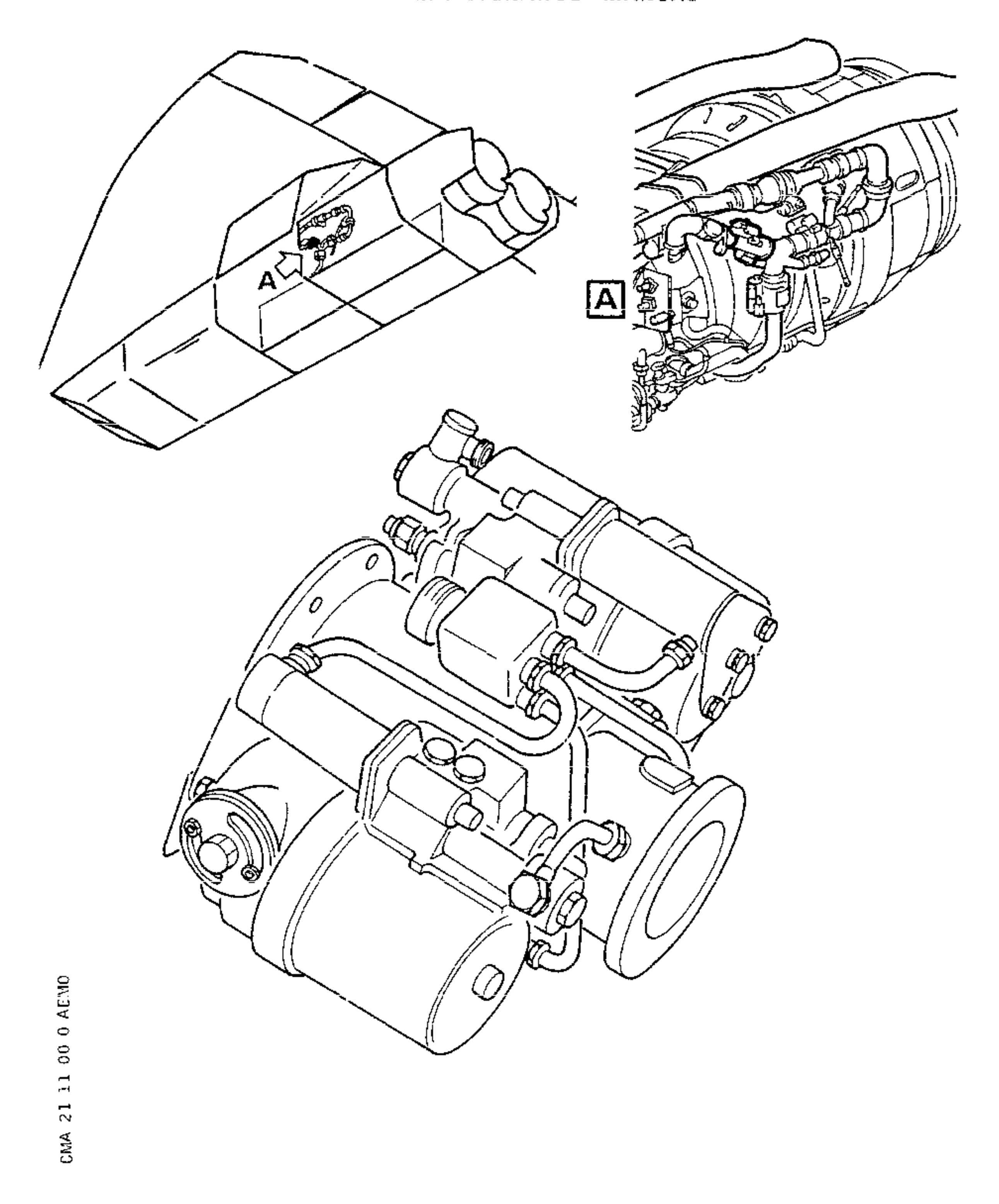




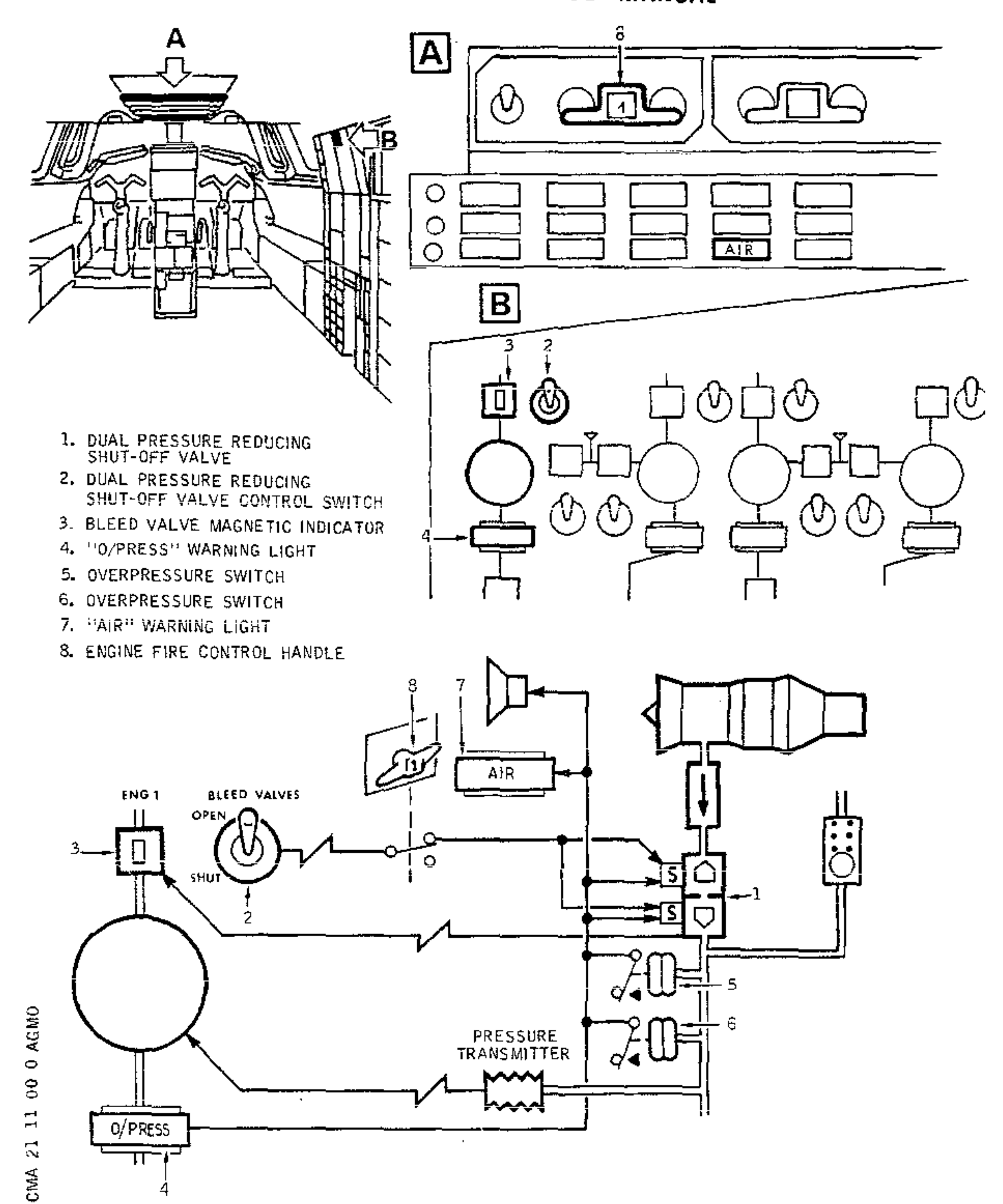


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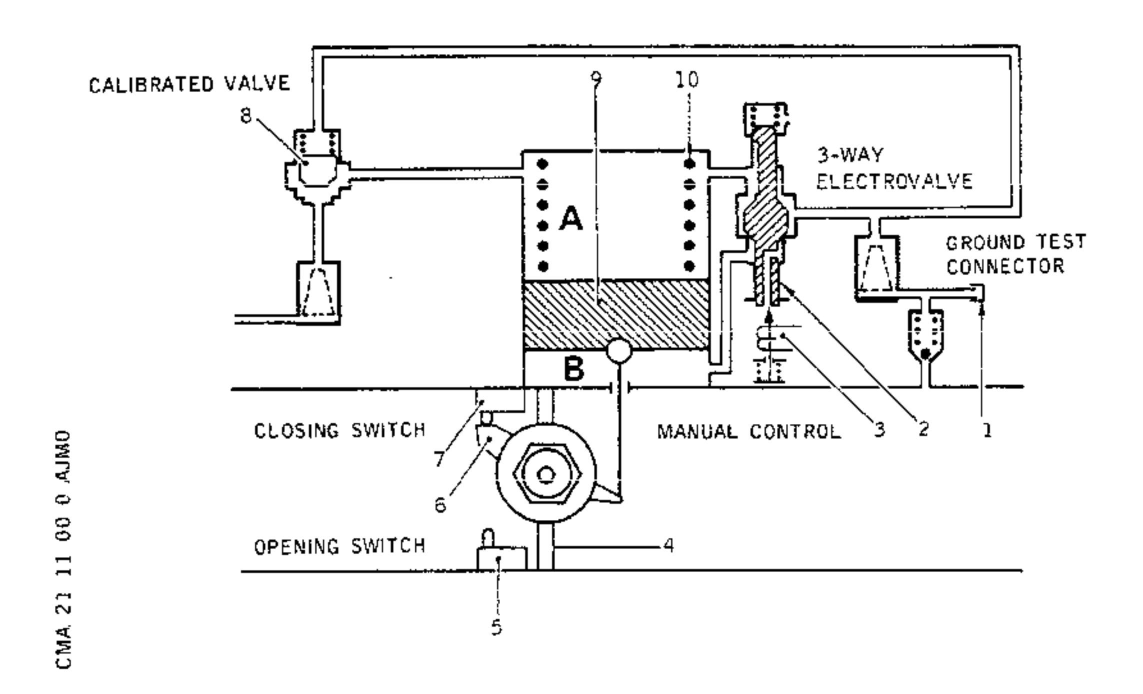
Non Return Valve
Figure 002



Dual Pressure Reducing Shut Off Valve
Figure 003



Dual Pressure Reducing Shut Off Valve Control
Figure 004



Shut Off Function of the Valve
Figure 005

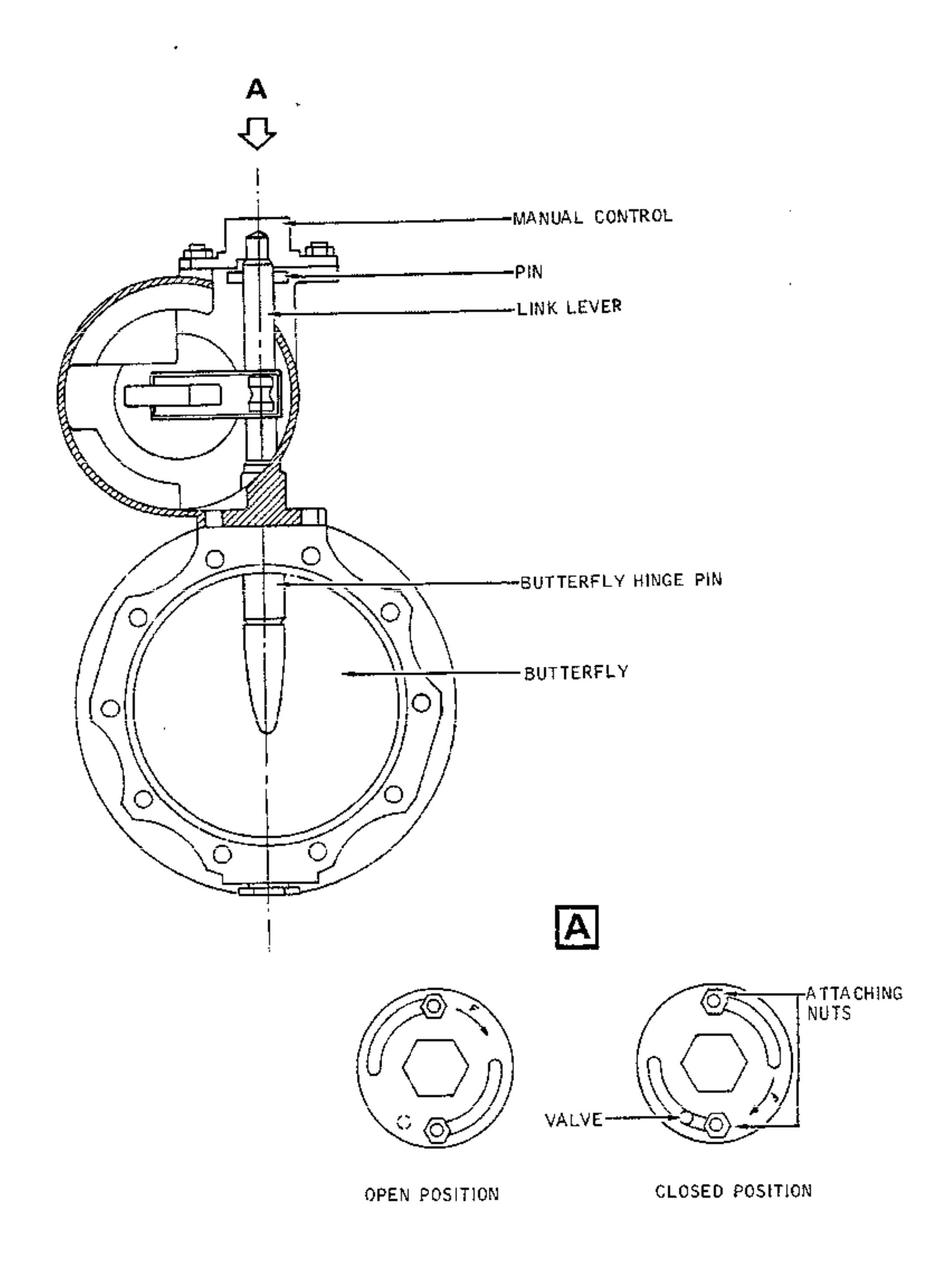
(e) A return spring (10) which holds the butterfly (4) in the closed position by acting on both piston and cylinder.

(f) A 3 way electrovalve (2) controlled by a solenoid (3) enables chambers A or B to be pressurized or vented.

(g) A calibrated valve (8) subjected to upstream-downstream differential pressure. When downstream pressure is greater than upstream pressure, down-stream pressure penetrates chamber A supply system through a filter.

(h) 2 microswitches (5) and (7) actuated by cam (6), which transmit the full closing and full opening signals to BLEED VALVES magnetic indicator on Flight Engineer's panel.

(j) A ground test connector.



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Closing Manual Control
R Figure 006

(k) A valve closing manual control comprising : (Ref. Fig. 006)

(k1) A lever mounted at the butterfly hinge pin end.
This lever is crossed by a pin.

(k2) A manual control with two mechanical stops. During normal butterfly operation this manual control is held against the valve body by two nuts.

(k3) A valve which vents chamber B when manual closing control is operated.

The manual control is used to move butterfly to closed position when it has seized up in open position. A special device vents chamber A when the control is operated.

(2) Downstream section : pressure reducing valve (Ref. Fig. 007)

This valve limits air pressure to 65 ± 3 psi (4.5 ± 0.2 bars).
It consists mainly of :

(a) A hollow cylindrical body.

(b) A butterfly (16).

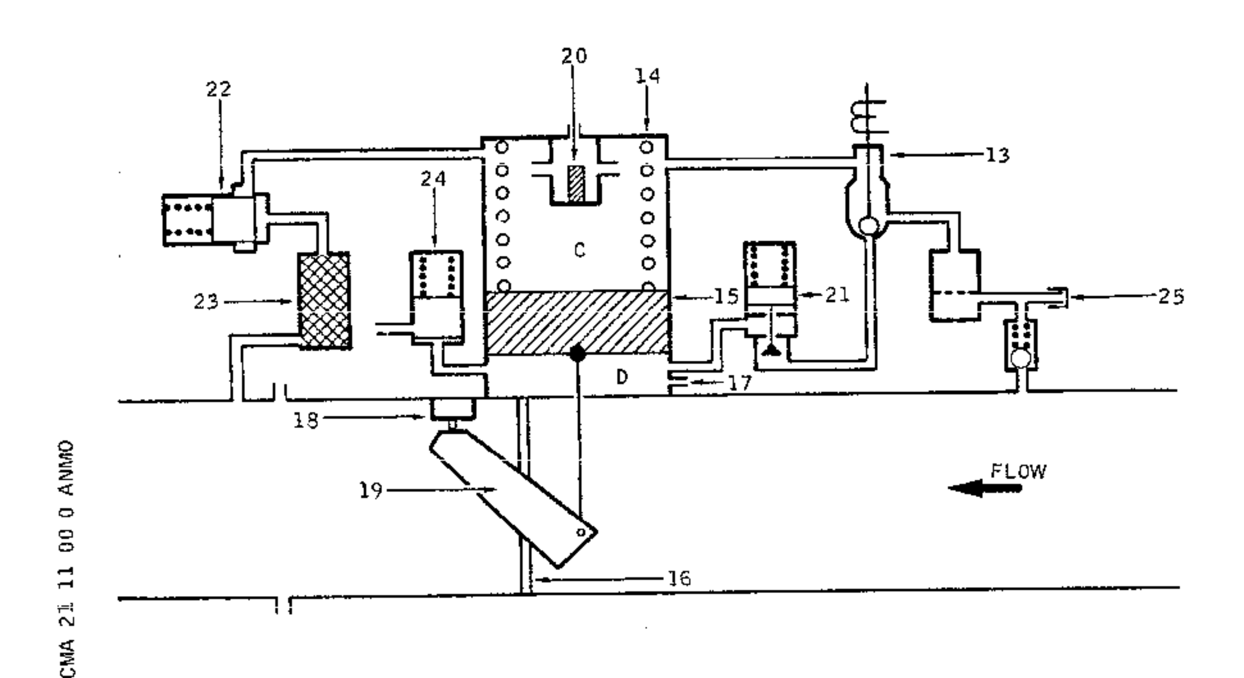
(c) A cam (19) coupled to the butterfly which actuates end-of-travel microswitch (18).

(d) A control piston (15) linked to cam (19). At rest this piston is held in closed position by return spring (14).
The piston separates the two chambers C and D.

(e) A calibrated valve (20), provided with a thermostatic cam. Its function is to evacuate any substantial leaks which may occur between piston (15) and cylinder when the chamber is supplied at high temperature.

(f) A pressure reducing valve (21).

(g) An overpressure valve (24) which limits pressure in D chamber if pressure reducing valve (21) operation is faulty.



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Reducing Function of the Valve
Figure 007

(h) A calibrated valve (22) subjected to downstream pressure. The pressure first flows through filter (23), then through the valve. It allows chamber C to be supplied when downstream pressure is higher than the calibration value of the valve.

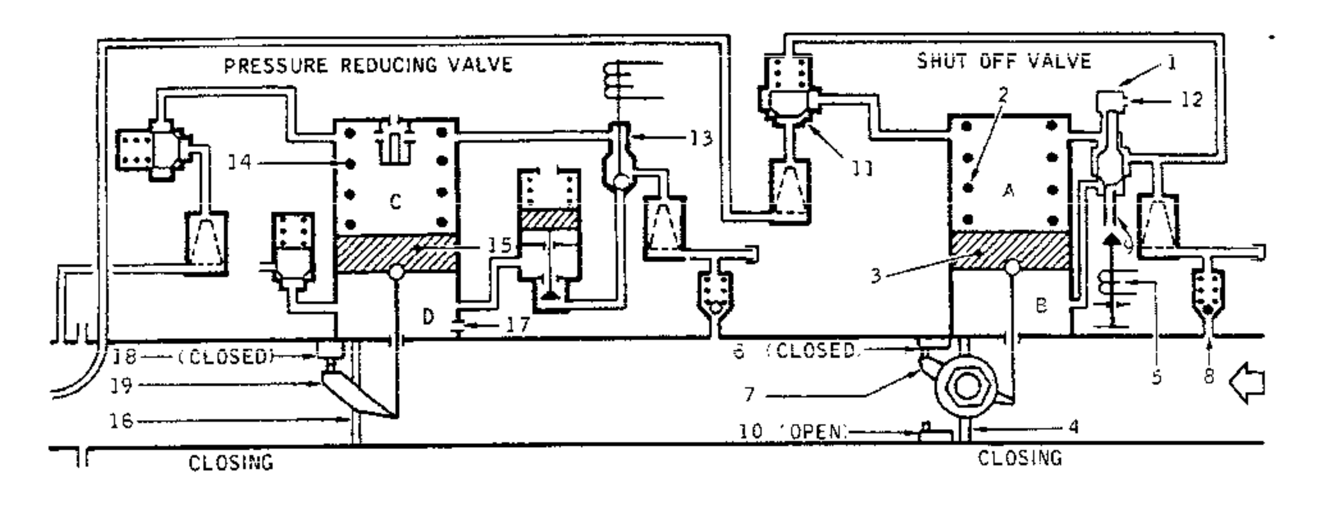
(j) An electro-valve (13) controlled from flight engineer's panel by BLEED VALVES switch.

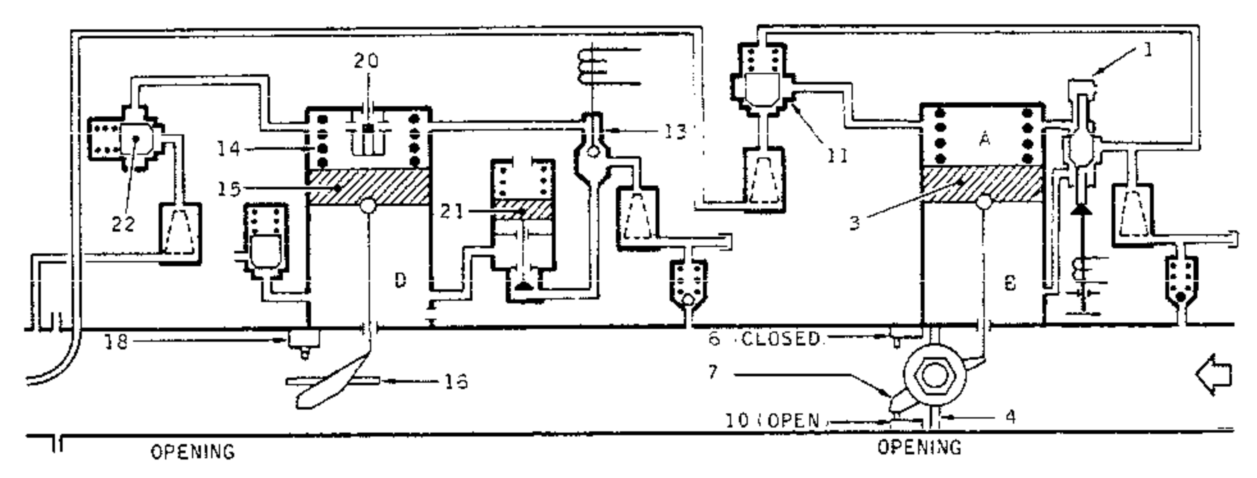
(k) An end-of-travel microswitch (18) actuated by cam (19) which transmits the closed position signal to BLEED VALVES magnetic indicator which indicates closed.

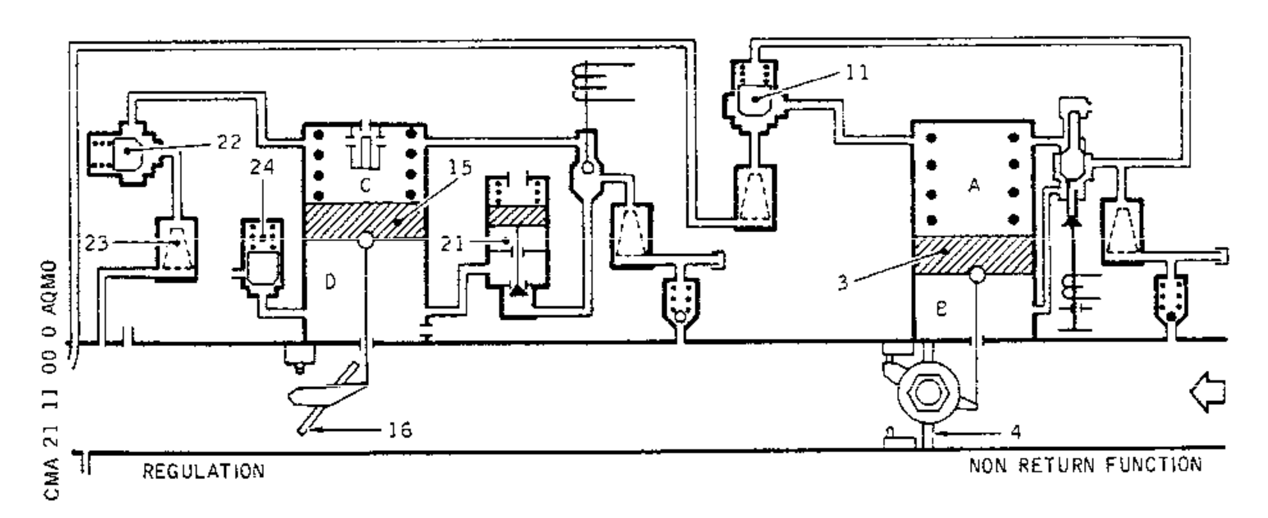
NOTE : BLEED VALVES magnetic indicator displays CLOSED only if both valves of dual pressure reducing and shut off valve are closed.

(l) An electrical connector (25) for ground test.

B. Operation (Ref. Fig. 008)







Dual Pressure Reducing Shut Off Valve - Operation
Figure 008

The reducing valve and shut off valve operation is independant.

(1) Operation of shut off valve

(a) Closing

When there is no pressure, the electro valve (1) receives no electrical signal ; return spring (2) holds piston (3) in down position. The valve butterfly (4) is in closed position.
As soon as pressurized air flows through the upstream orifice, (8) chamber A is pressurized ; chamber B on the other side of the piston remains at ambient pressure by means of air vent orifice (9).
The resultant force of spring (2) and chamber A pressure applied to the piston (3) hold the butterfly (4) in closed position.
Microswitch (6), associated with butterfly (4) and activated by cam (7) transmits a valve closing signal.

(b) Opening

On receiving an electrical signal the electrovalve (1) solenoid (5) shuts off the air vent orifice (9) and moves the electrovalve slide-valve to its high position. Chamber B is then subjected to upstream pressure and is vented through air vent orifice (12) Upstream pressure acts on the piston, causing the butterfly to fully open when the differential pressure between chambers A and B equals 0.7 bars (10,15 psi)
Actuated by cam (7) and associated butterfly the microswitch (10) transmits a valve opening signal.

(c) Non-return function

With butterfly (4) in fully opened position, the higher pressure downstream than upstream tends to create a reverse flow across the dual pressure reducing shut off valve. Valve (11) calibrated to a very low value opens as soon as the differential pressure between downstream and upstream pressure reaches the calibration value. Chamber A is subjected to downstream pressure, which acts on the piston and shuts the butterfly (4).
Air escape through the air vent (12) has a negligible effect.

(d) Operation of closing manual control
(Ref. Fig. 006)

If, by accident the valve butterfly is seized in the open position it is possible to close it, as follows, by means of manual control :

- Loosen by one turn both manual control locking nuts.
- Rotate manual control 90° in direction of arrows engraved on visible side.
  The butterfly moves to the closed position and chamber B is vented through the valve.
- Tighten both locking nuts.

(2) Operation of pressure reducing valve

(a) Closing

The electro valve (13) receives no electrical supply. When there is no upstream pressure, return spring (14) applies force to piston (15) and holds butterfly (16) in closed position.
When pressure exists upstream of pressure reducing valve, chamber C is pressurized ; the opposite chamber D is vented through air vent orifice (17).
The force resulting from the difference between spring (14) load and pressure applied to piston (15) continuously holds butterfly (16) in closed position.
Microswitch (18) associated with butterfly (16) and actuated by cam (19) transmits the closed signal to BLEED VALVES magnetic indicator.

(b) Opening

Upstream relative pressure is at least 0.7 bar ; the differential pressure between chambers C and D which acts on piston (15) is greater than spring (14) load.
However, this pressure is lower than valve adjustment downstream relative pressure, the nominal value of which is 4.5 bars (relative value).
Electrovalve (13) is electrically supplied ; chamber C is vented through thermostatic valve (20).

Upstream pressure enters chamber D through pressure reducing valve (21) when it is in fully open position.
The load applied to piston (15) is greater than

spring (14) force, thus the piston moves to the up position and butterfly (16) is left in fully open position.

(c) Pressure control

Pressure control is obtained as soon as upstream pressure reaches a value which allows the pressure reducing valve to limit downstream pressure to 4.5 bars (65 psi) (relative value).

After passing through conical filter (23) downstream pressure acts on valve (22). Valve displacement allows downstream pressure to flow into chamber C. Chamber D is subjected to a constant pressure of 4.85 bars (70 psi) relative value. This pressure is regulated by pressure reducing valve (21) and pressure relief valve (24). In the event of an increase in upstream pressure, the slight instantaneous increase of downstream pressure which results, acts on chamber C. The variation of differential pressure on the two faces of piston (15) tends to cause butterfly (16) to close until the mormal downstream pressure value is reached.

In the event of decreasing upstream pressure, the system would operate in reverse in order to proportionally increase the opening of butterfly (16).

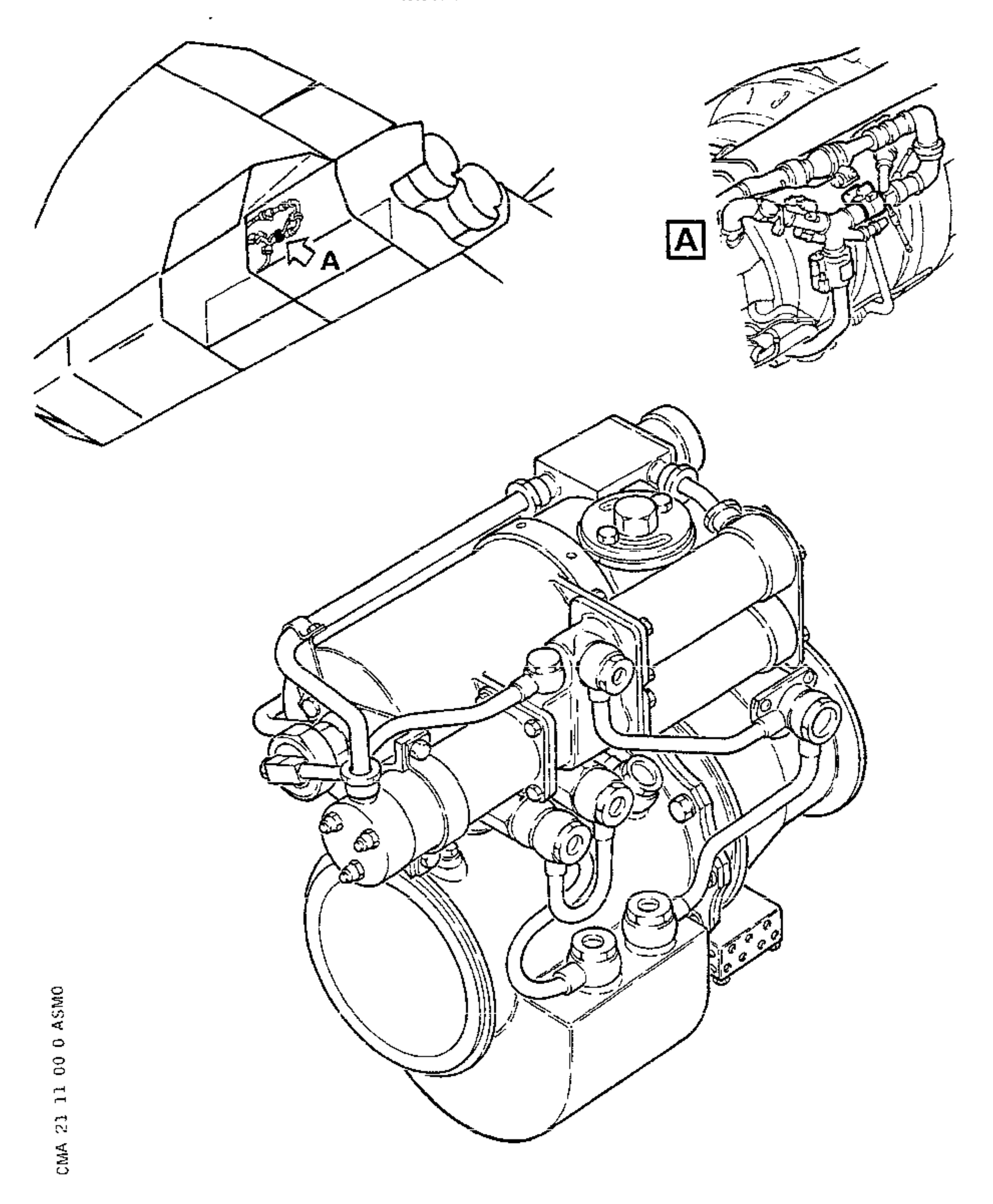
In the same way, any sudden variation of downstream pressure resulting from an increase or reduction in flow, would act directly on chamber C, thus adjusting the degree of butterfly opening in order to restore downstream pressure to its normal value.

5. <u>Valve - Air Conditioning</u>
(Ref. Fig. 009)

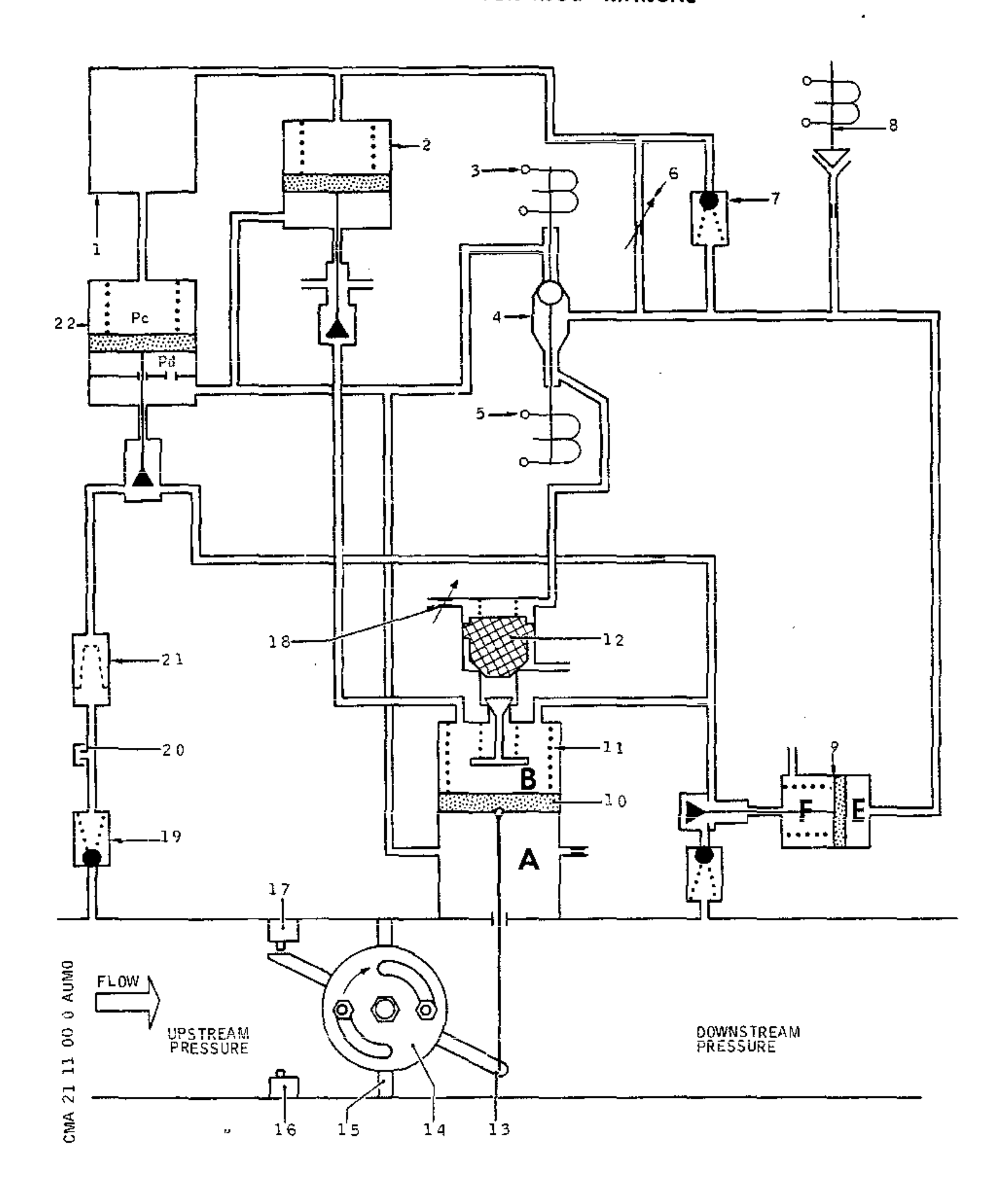
A. Description (Ref. Fig. 010)

This valve is controlled by COND VALVE switch and by the group safety system. The valve is located downstream of pressure reducing and shut off valve.
Its function is :

- to close and open conditioning air flow according to a linear law.
  - opening time : 15 seconds approximately



Air Conditioning Valve
Figure 009



Air Conditioning Valve Description
Figure 010

- closing time : 10 seconds approximately
In safety function, the air conditioning valve closing time is 2 seconds maximum.

The valve consists mainly of :

(1) Two hollow cylindrical bodies connected by means of 10 screws.

(2) A butterfly (15).

(3) A cam (13) coupled to the butterfly which allows end-of-travel microswitches (16) and (17) to be energized.

(4) A piston (10) moving inside a cylinder.
The piston separates two chambers A and B. Piston (10) movement is transmitted to butterfly (15) via a lever which operates the butterfly pins.

(5) A return spring (11) which, in rest position, holds piston (10) in closed position.

(6) An upstream pressure tapping orifice supplying chambers A and B through non return valve (19) and filter (21).

(7) A ground test connector (20) which allows the valve to be supplied by a ground air supply unit when there is no upstream pressure.

(8) A time delay device which enables the pressure to vary in chamber A according to a given law.
It consists of :

(a) A pressure reducing valve (22) which separates two pressure chambers Pc and Pd.

(b) A pressure absorber (1).

(c) A closing adjustable air vent orifice (18).

(d) A 3 channel distributor (4) controlled by two solenoids (3) and (5) which enables the valve to open or close.

(e) A non return valve (7) provided with an opening adjustable air vent orifice (6) which makes it possible to obtain, during the valve opening phase, increase of pressure in chamber A with respect to the time.

(9) An end-of-travel device (9) which enables full closing

of the valve when pressure in pressure absorber (1) is nil.
It consists of :

- a body,
- a piston which separates two chambers E and F respectively subjected to pressure in pressure absorber (1) and to ambient pressure.
- a distributor operated by the piston,
- a calibration spring.

(10) An end of opening device (2) which enables full opening of the valve when pressure in pressure absorber (1) is equal to chamber A pressure.
It consists of :

- a body,
- a piston,
- a distributor operated by the piston,
- a calibration spring.

(11) A device (12) locking the valve in open position.

(12) An emergency closing device, which consists of an electrovalve (8) allowing quick depressurization of pressure absorber (1) and thus quick closing of the valve.

(13) Two microswitches (16) and (17) actuated by cam (13) and which transmit the opening or closing signal to COND VALVE magnetic indicator on Flight Engineer's panel.

(14) A closing manual control (14), identical to that of shut off valve.

B. Operation

(1) Valve operation principle

The valve is provided with a time delay device located on chamber A supply system, and an air return which connects chamber B to downstream pressure.

If pressure exists upstream of the valve and if chamber A is pressurized, downstream pressure is equal to chamber A pressure whatever the airflow through the valve.
If downstream pressure were greater than chamber A pressure, it would cause the valve to close and if less it would cause the valve to open. Downstream

pressure is equal to chamber A pressure.
The time delay device causes pressure in chamber A (downstream pressure) to vary according to a given law :

- During the valve opening phase, pressure in chamber A increases according to a linear progression.
- During the valve closing phase, pressure in chamber A decreases according to a linear progression.

(2) Operation of time delay device

(a) Opening cycle

When pressure in pressure absorber (1) is nil, pressure in chamber A, regulated by pressure reducing valve (22) calibrated spring, is 300 mbars.

When the solenoid (5) is energized, distributor (4) positions in such a way that pressure from pressure reducing valve (22) is admitted to pressure absorber (1).
The increasing pressure in pressure absorber acts in chamber Pc of pressure reducing valve (22) which, by its valve opening wider, causes the pressure to increase downstream of pressure reducing valve.
The increase of pressure equals pressure in the pressure absorber.

Pressure in chamber A is thus equal to pressure in pressure absorber + 300 mbars.

This constant differential pressure value of 300 mbars makes it possible to obtain a linear progression for the increasing pressure in pressure absorber and thus in chamber A.
When pressure stops increasing, pressure reducing valve (22) is fully open, upstream pressure is approximately equal to pressure in chamber A, pressure absorber (1) pressure equalizes chamber A pressure, and the differential pressure thus tends to become zero.

NOTE : The time delay device is designed to obtain a pressure increase in 15 seconds approximately, when upstream pressure is equal to 4,5 bars (relative value).

(b) Closing cycle

When the solenoid (3) is energized, the distributor (4) positions in such a way that pressure absorber (1) is vented through non return valve (7) and closing air vent orifice (18).
Pressure absorber (1) is no longer supplied.
As for the opening cycle chamber A pressure is equal to pressure absorber pressure + 300 mbars
Thus, chamber A pressure variation follows the same law as pressure variation in pressure absorber (1).

NOTE : Pressure absorber and closing air vent orifice (18) openings are designed so that pressure is released in 10 seconds approximately when upstream pressure is equal to 4.5 bars approximatively (relative value).

(3) Operation of end of closing and end of opening devices

(a) Closing device

When pressure in pressure absorber (1) is nil during closing cycle, pressure in chamber A is equal to 300 mbars (under force of pressure reducing valve (22) spring).

Thus, butterfly (15) is not in required closed position.
An end of travel device enables the butterfly to be closed.
Since there is no pressure in pressure absorber (1), device (9) under the action of calibrated spring, isolates chamber B from downstream pressure. Upstream pressure enters chamber B.
A force is applied to the piston which drives the valve to closed position.
Microswitch (17) actuated by cam (13) transmits a closed signal to COND VALVE magnetic indicator on Flight Engineer's panel.
As soon as pressure increases in pressure absorber (beginning of opening cycle), device (9) connects chamber B with downstream pressure ; the opening cycle is normally carried out.
Device (9) opens at the beginning of valve opening cycle and closes at the end of closing cycle.

(b) Opening device

At the end of the opening cycle, the pressure drop through pressure reducing valve (22) prevents chamber A pressure from being equal to upstream

pressure. The valve does not open fully (1). An end of opening device (2) eliminates this drawback.

At the end of the opening cycle pressure in pressure absorber (1) tends to equal Pd pressure. Consequently, the spring of device (2) causes the associated distributor to open, chamber B is vented and the valve opens fully.
Microswitch (16) actuated by cam (13) transmits valve fully open signal to COND VALVE magnetic indicator on Flight Engineer's panel.

(4) Operation of fully open locking device

This device (12) consists of a valve fitted with a spring, a body, and a second valve. Its purpose is to prohibit untimely closing of the valve when it is fully open, when upstream pressure increases rapidly.

With air conditioning valve fully open, piston (10) unseats the first valve which vents chamber B.

The second valve leaves its seat.
During the closing cycle, the electrovalve (4) is in such a position that pressure in pressure absorber (1) acts on the second valve, which prevents chamber B from being vented.

(5) Operation of emergency closing device

This device (8) makes it possible to depressurize completely pressure absorber (1) through non return valve (7), thus air conditioning valve closes rapidly (closing time : approximately 2 seconds).
Electrovalve of device (8) is controlled by the group safety system which simultaneously acts on normal closing electrovalve (3) of distributor (4).

(6) Operation of closing manual control.

This control (14) enables manual closing of butterfly (15), if by accident, the latter becomes seized in open position.

- Loosen both locking screws one turn.
- Rotate manual control 90° in direction of arrows on visible side.
- Tighten both locking screws.

6. Valve - Mass Flow Control

(Ref. Fig.011 and 012)

A. Description

The mass flow control valve is located downstream of air conditioning valve. It controls the conditioning airflow to the cabin. It has also a shut off function.
It consists mainly of :

- a mass flow valve assembly
- a controller assembly
- two solenoid valve assemblies
- a shut off valve assembly

(1) Mass flow valve assembly (4).

It consists of two bodies (venturi body and outlet body) attached to a center support making up the main body.

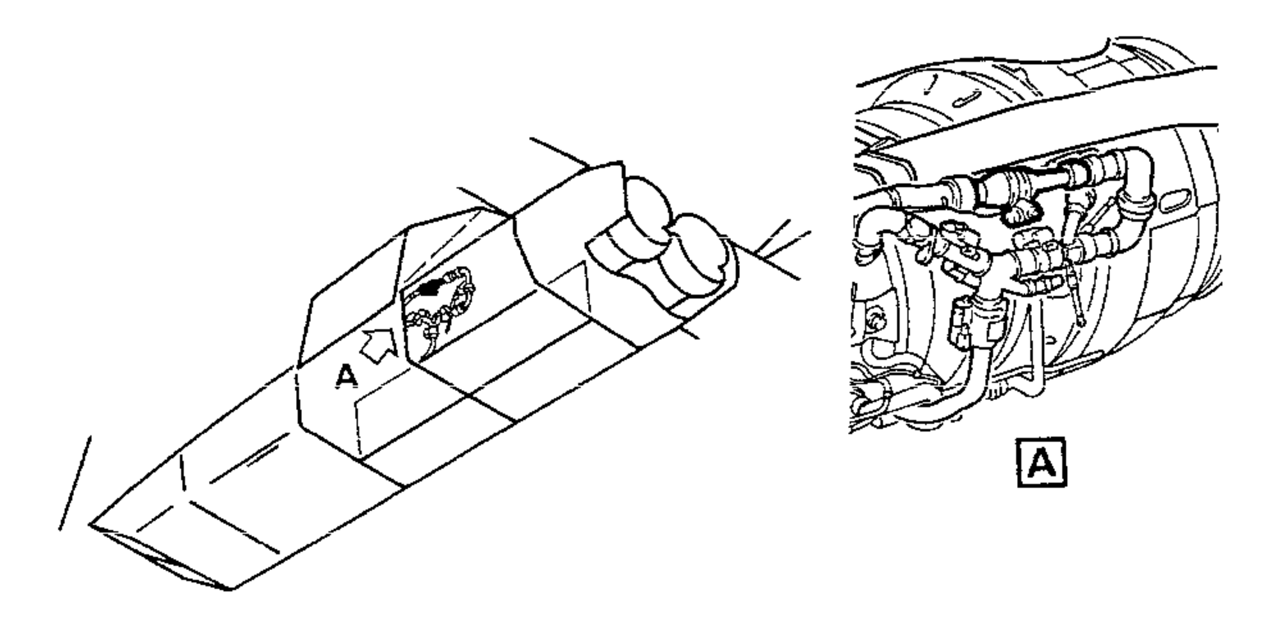
A deflector is located at the rear of the center support ; a cylindrical housing is located at the front part. A center shaft is attached to the front part of cylindrical housing ; a fixed inner piston (15) is fitted to the shaft. An outlet piston (14) slides on inner piston and on shaft. It opens and stops the airflow.

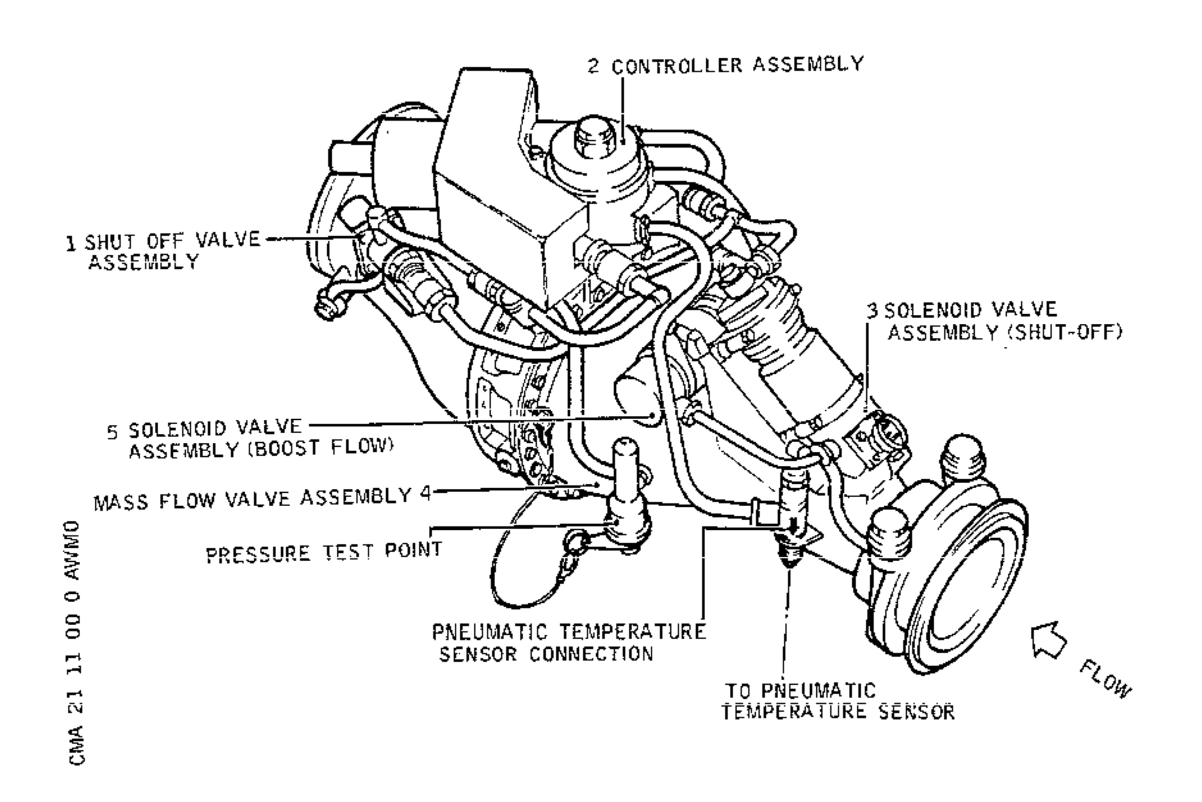
A pressure chamber (PC) is located between inner piston and outer piston ; a pressure chamber PD is located between outer piston and cylindrical housing.

Air pressure flows into PC chamber through holes located on center shaft and on center support.
The valve upstream or downstream pressure (according to shut off valve assembly (1) position) arrives in PD chamber through an external tube and a hole in center support.
A non-return valve (18) with a permanent small leak is located on PC chamber supply system.

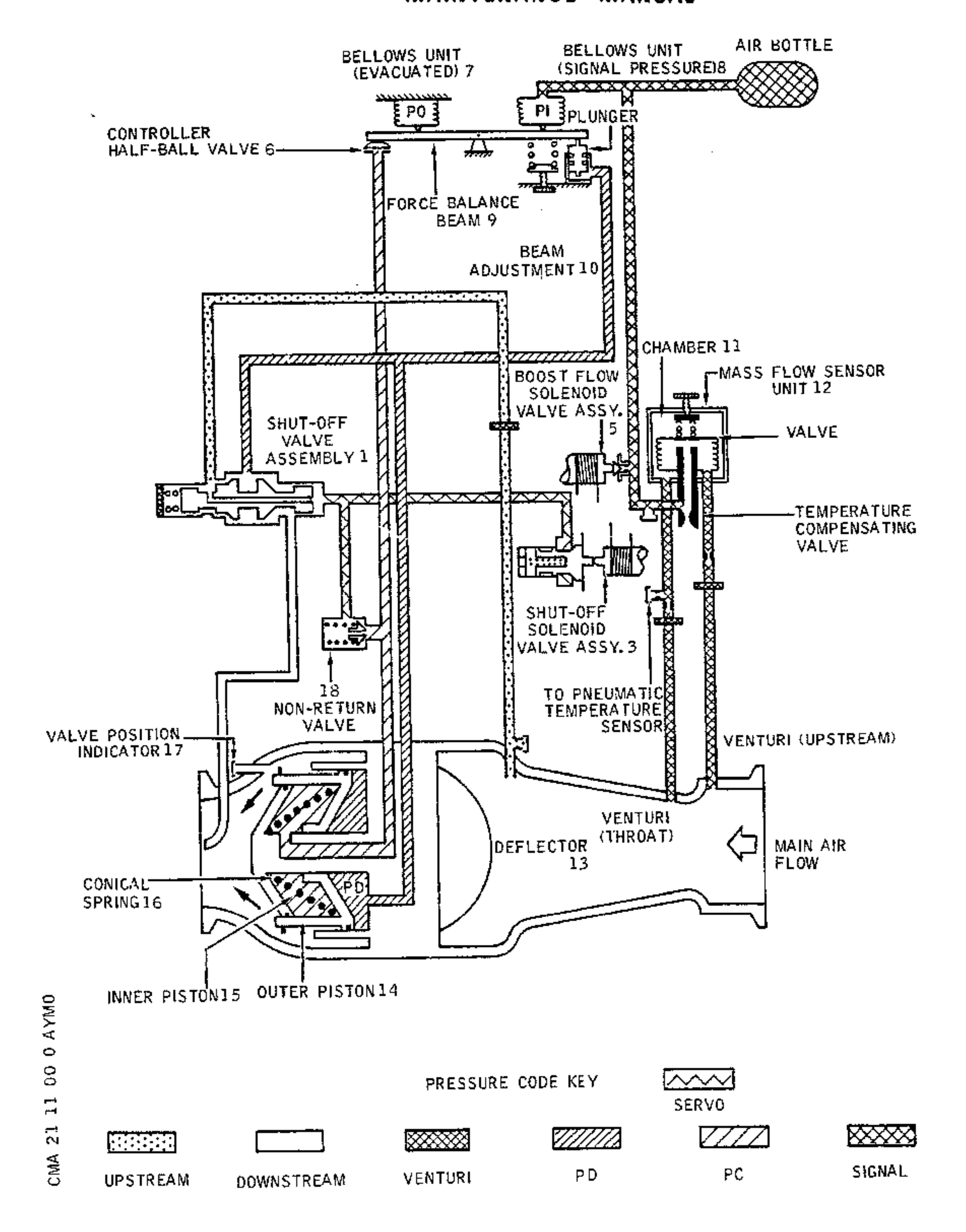
Pressure is tapped at two points upstream of mass flow control valve.
The venturi upstream pressure reaches chamber (11) capsule through a filter and a calibrated orifice. The venturi throat pressure flows to chamber (11) through a filter and a T restrictor.

The T restrictor is connected to pneumatic temperature sensor located downstream of primary heat exchanger.
A valve position indicator (17) indicates the valve





Mass Flow Control Valve
Figure 011



Mass Flow Control Valve - Schematic Diagram
Figure 012

position on the ground.

(2) Controller assembly

It consists of a mass flow sensor unit (12), a PO bellows unit (7), a PI bellows unit (8), receiving control pressure, a force balance beam (9) and a beam adjustment spring (10).

The mass flow sensor unit consists of :

- a chamber receiving the venturi throat pressure
- a capsule receiving the venturi upstream pressure
- 2 valves one of them being a temperature compensating valve
- an adjustment device

The differential pressure between mass flow sensor chamber and capsule is proportional to the airflow through the venturi.
The resulting pressure is applied to PI bellows unit.
An air bottle absorbs the sudden pressure surges of the resulting pressure.

The force balance beam is balanced by means of forces applied by bellows units PO and PI, by beam adjustment spring and by a pneumatic control piston.
A controller half ball valve (6) is controlled by force balance beam and causes PC pressure to vary.

(3) Shut off solenoid valve assembly (3).
It operates in relation with shut off valve assembly (1). Its solenoid activates a spring valve.

The spring valve opens or closes servo pressure of shut off valve assembly, which has the effect of controlling the mass flow control valve.

When the solenoid is energized the mass flow control valve closes.
If electrical power supply fails the control function of mass flow control valve operates.

(4) "BOOST" flow solenoid valve assembly (5)

When the solenoid is energized, PI bellows unit pressure is reduced because control pressure is vented.

(5) Shut off valve assembly (1)

It consists of a body with two seats, a valve and

spring. The valve may have two positions ; in one position Pd chamber is pressurized with upstream pressure (mass flow control valve is closed), in the other position, PD chamber is pressurized with downstream control pressure. The shut off solenoid valve assembly servo pressure is tapped on line connecting PC chamber to controller half-ball valve.

B. Operation

(1) Rest position

When the air does not flow through mass flow control valve, pressure in PI bellows unit is null ; thus this bellows unit does not act on force balance beam (9). The controller half ball valve (6) is closed.
The shut-off solenoid valve assembly (3) being open (energized), servo pressure is vented and valve of shut-off valve assembly (1), under the action of its spring will be in such a position that chamber PD is connected to upstream pressure, and outer piston force exceeds spring resistance and closes the valve.

(2) Opening

When the shut off solenoid valve assembly (3) is closed (non energized) servo pressure enters PC chamber through non-return valve (18).

Simultaneously this servo pressure applies a force to the valve of shut off valve assembly (1) ; chamber PD is no longer supplied with upstream pressure and downstream pressure is directed to PC chamber.

Outer piston (14) is moved rearwards by the increase of PC pressure, decrease of PD pressure, and conical spring (16) force. The mass flow control valve opens.

(3) Pressure control

(a) When the airflow increases in the venturi, the differential pressure (venturi throat/upstream of venturi) increases. Bellows unit P1 pressure is proportionally increased.

When pressure increases in PI bellows unit, a force is applied to the force balance beam ; it rotates and causes air to escape through controller half ball valve. PC pressure decreases ; thus valve of shut off valve assembly (1) moves and allows downstream pressure to be admitted to cham-

ber PD. Outer piston (14) compresses conical spring (16) and tends to close the mass flow control valve until it reaches a balanced position.

(b) If airflow decreases in the venturi, the differential pressure (venturi throat/venturi upstream pressure) decreases. Pressure decreases in PI bellows unit.

The force applied by PI bellows unit to force balance beam decreases and force balance beam tends to close controller half ball valve. Pressure PC increases, pressure PD decreases and outer piston (14) moves to the open position. Airflow increases through mass flow control valve.

This pressure control makes it possible to have a constant airflow through the mass flow control valve, in spite of the upstream air pressure variations.

(4) Boost flow

It is an increased flow through the mass flow control valve. In normal operation, the airflow rate is 0.36 kg/s.
If an air conditioning group fails it is necessary to increase the airflow rate to (0.42 kg/s).

The function of boost flow solenoid valve assembly (5) is to increase the airflow.
When the solenoid valve is energized, a controlled leak is created on bellows unit control pressure.

The bellows unit retracts, which unbalances force balance beam (9).
Controller half ball valve (6) leak decreases, PC pressure increases, consequently the outer piston moves backwards and airflow is increased.
When the BOOST airflow is no longer needed, de-energization of BOOST flow solenoid valve assembly returns the mass flow control valve to "Control" position.

(5) Closing

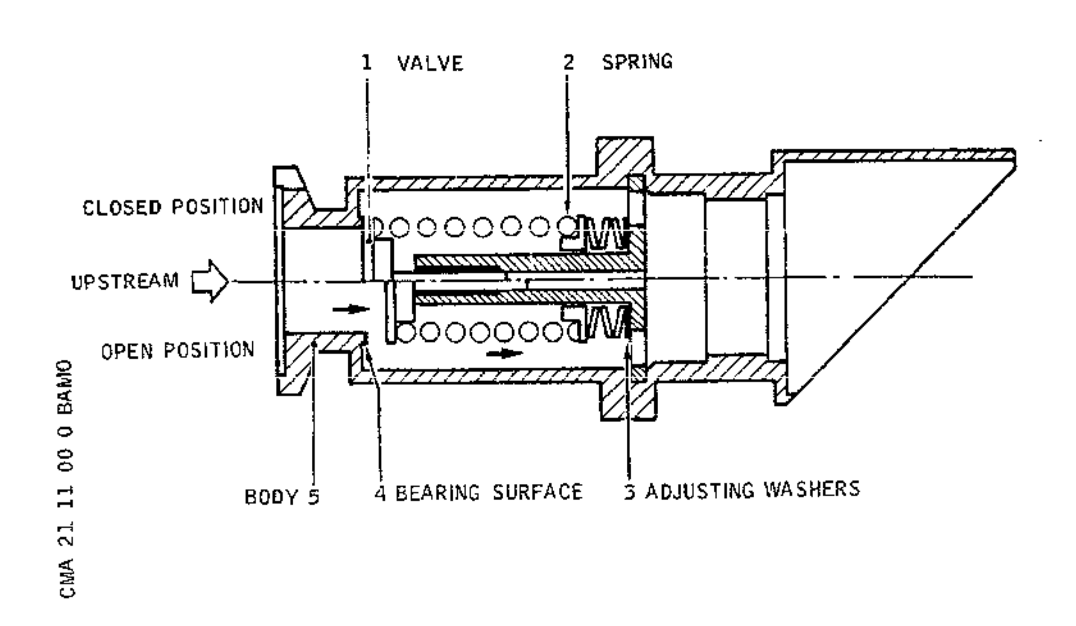
When the shut-off solenoid valve assembly (3) is energized, the mass flow control valve closes.
Servo pressure is vented.
The valve of shut off valve assembly (1) is moved by associated spring, thus PD chamber is subjected to upstream pressure.

Pressure in PD chamber exceeds conical spring force and allows the outer piston to close the airflow.

(6) Pneumatic temperature sensor assembly

The function of this sensor (located downstream of primary heat exchanger) is to create a pressure drop in the air pressure supply from the venturi throat ; the mass flow control valve tends to close. Since the airflow decreases, the downstream temperature also decreases.

7. Valve - Pressure Relief
(Ref. Fig. 013)



Pressure Relief Valve
Figure 013

A. Description

The pressure relief valve is located downstream of pressure reducing and shut off valve.

It is attached to the air conditioning duct by a clamp.

It consists mainly of :

- a cylindrical body (5)
- an internal valve (1) which seats on a bearing surface (4).
  The valve slides in a guide
- a spring (2) holding the valve in closed position
- adjusting washers (3).

B. Operation

(1) Closing

When upstream pressure applied to valve (1) is lower than spring force, valve (1) is held on its seat, which prevents the air from flowing outwards.

(2) Opening

When upstream pressure reaches 75 ± 5 psig (5.2 ± 0.35 bars) this pressure load exceeds spring force. Valve (1) unseats, and airflow is vented.
The extent of valve opening varies with upstream pressure.

8. Sensor - Temperature, Pneumatic
(Ref. Fig. 014)

A. Description

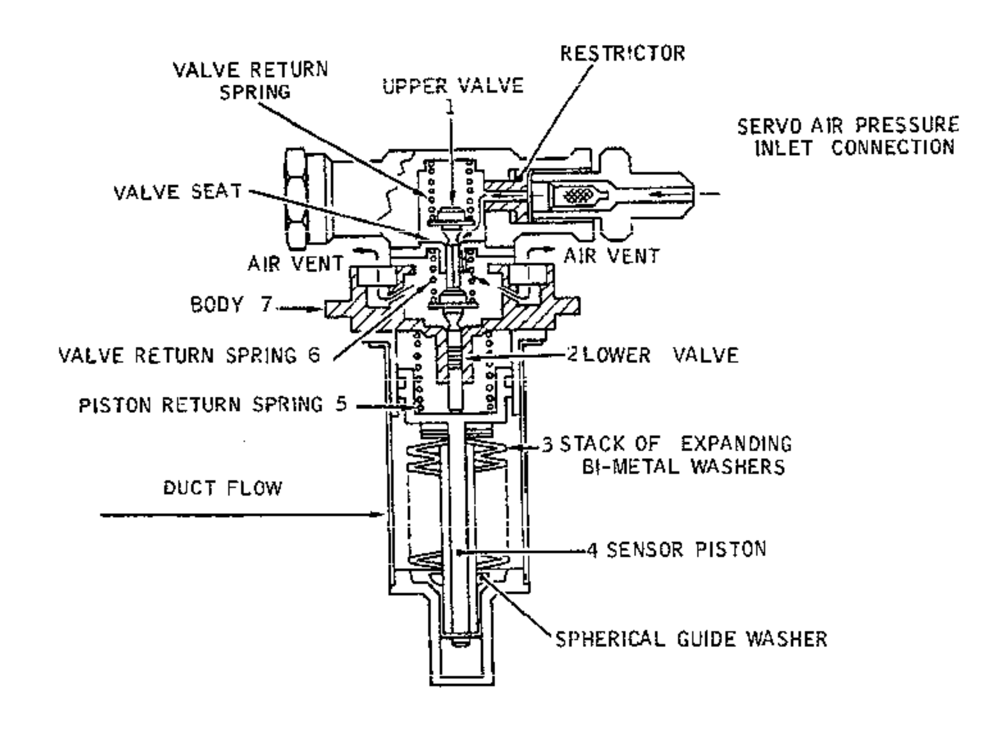
This sensor is located on air conditioning duct downstream of primary heat exchanger.
Under an excessive temperature condition, a pressure drop is created in mass flow control valve control pressure. The mass flow control valve tends to close, and the airflow entering refrigeration unit thus decreases.
The sensor consists mainly of :

- a body (7) attached to air conditioning duct
- a stack of expanding bi-metal washers (3) (thickness varies according to airflow temperature)
- a sensor piston (4)
- a lower valve (2)
- an upper valve (1)
- 2 return springs (5) and (6).

B. Operation

(1) Normal operation

When the conditioning airflow temperature is normal



Pneumatic Temperature Sensor
Figure 014

upper valve (1) is held on its seat by return springs. Pneumatic temperature sensor has no effect on operation of mass flow control valve.

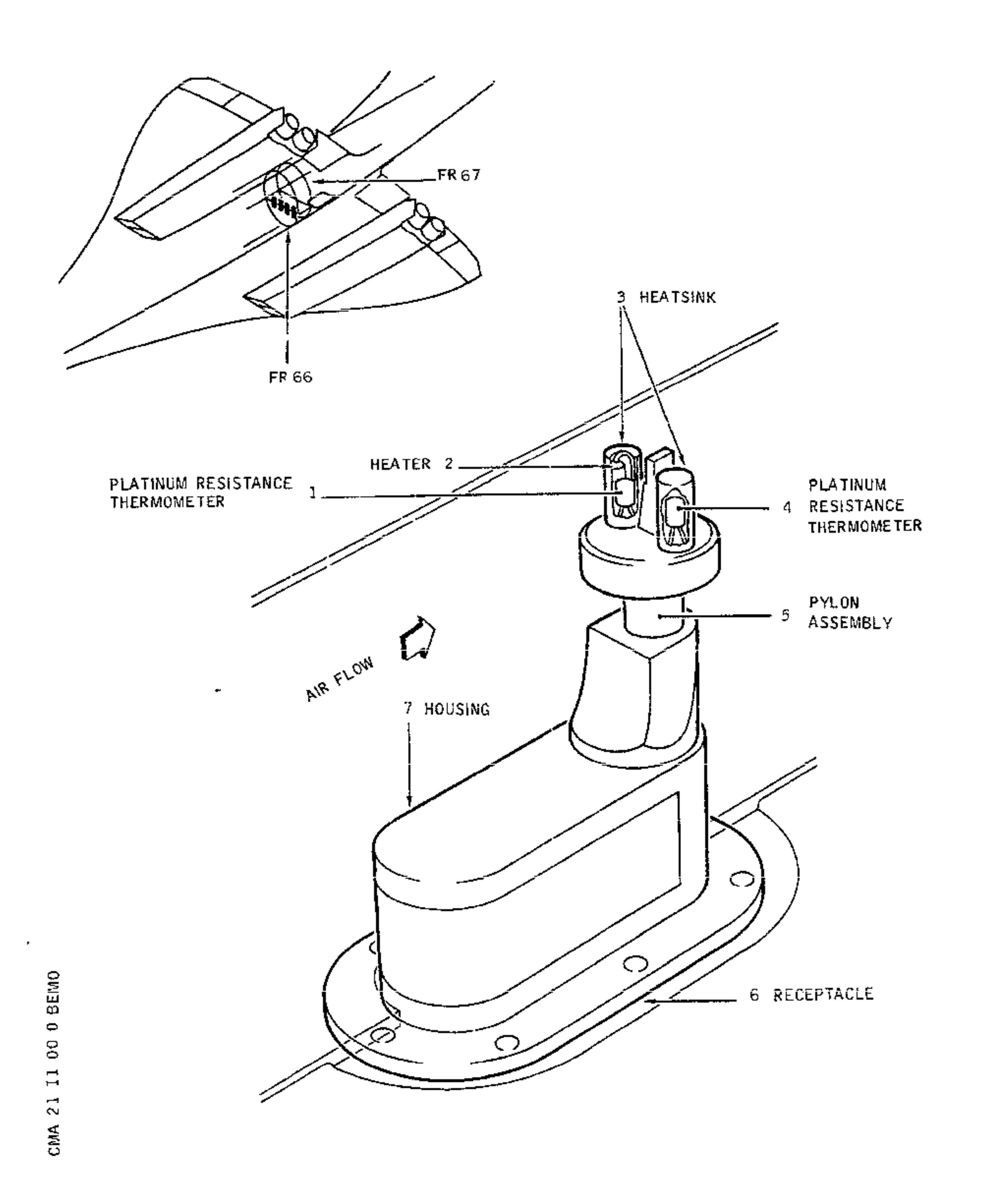
(2) Operation in temperature limitation condition

When airflow temperature controlled by sensor reaches 205 ± 5°C (401 ± 9°F), the stack of expanding bi-metal washers (3) expands and actuates sensor piston (4) which unseats upper valve (1).
Mass flow control valve control pressure is vented through orifices in pneumatic temperature sensor.
Mass flow control valve tends to close until air temperature reaches normal.

9. Sensor - Mass Flow
(Ref. Fig. 015)

A. Description

The mass flow sensor is located in air conditioning duct upstream of cabin isolation valve under the floor.

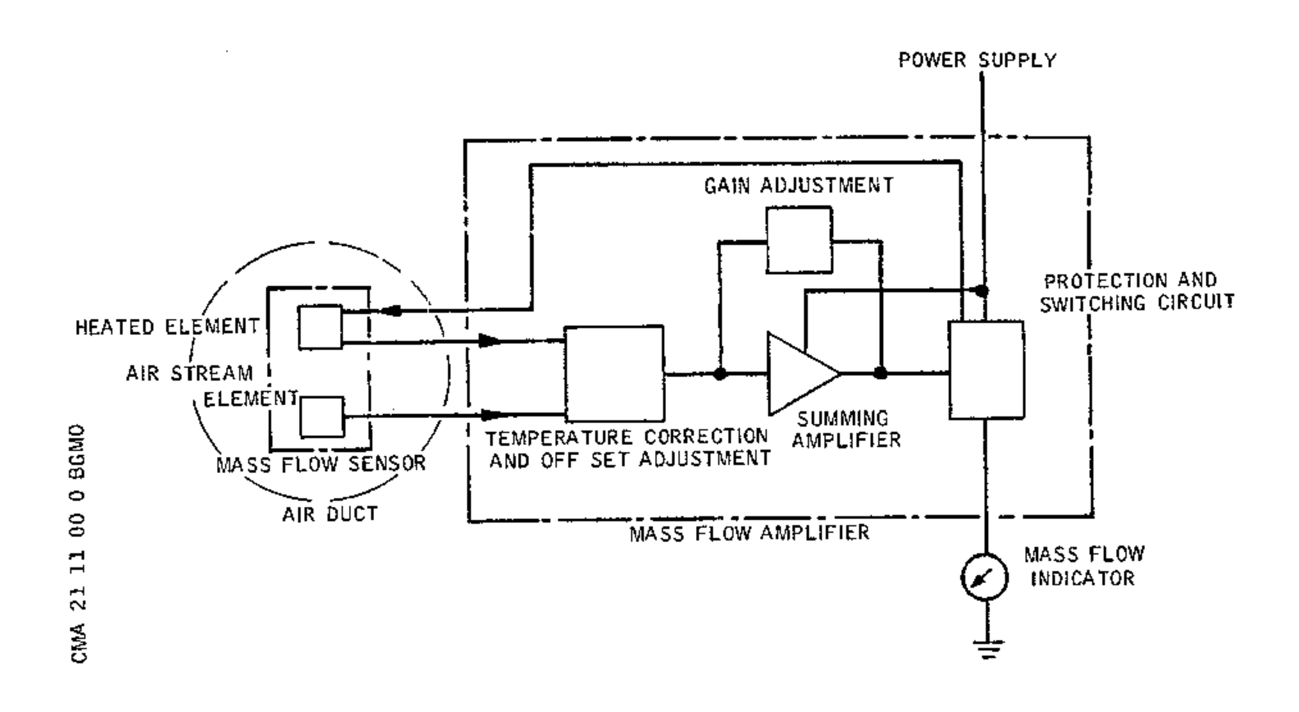


Mass Flow Sensor
Figure 015

It detects the cabin inlet airflow.
The corresponding signal is amplified and transmitted to a mass flow indicator located on flight engineer's panel.
The sensor consists mainly of :

- a housing (7) attached to a mounting base on air conditioning duct
- a pylon assembly (5)
- two platinum resistance thermometers (1) and (4) inside 2 heatsinks (3). One of the heatsinks has a heater (2)
- 2 ballast resistances housed in the body
- an electrical connector (6).

B. Operation (Ref. Fig. 016)



Mass Flow Indicating System - Schematic
Figure 016

When electrical power supply is constant, the heater, associated with a resistance thermometer, operates in such a way that the resistance temperature is determined by the cooling effect of conditioning air. The cooling effect depends on air temperature and flow.
The other resistance thermometer having no heater, is at

the air temperature.

The signals corresponding to the resistance thermometer temperature are compared and the resulting signal is amplified by the summing amplifier of corresponding air conditioning group control assembly.
The output signal is transmitted to mass flow indicator on Flight Engineer's panel.

10. Indicator - Mass Flow
(Ref. Fig. 017)

A. Description

The mass flow indicator consists of a winding having the function of a milliammeter ; an indicator pointer moves on a dial graduated from 0 to 8.
Each graduation corresponds to an air conditioning flow rate of 0.1 kg/sec.
When mass flow indicator is not energized, the pointer must position on the Ƶ graduation (lower than the 0 graduation).
The indicator is contained in a housing ; the rear of the housing is fitted with an electrical connector and a pointer adjustment screw.
The four mass Flow indicators are located on flight Engineer's panel.

B. Operation

The mass flow sensor output signal (paragraph 9.B.) is applied to the mass flow indicator winding. On the dial, the position of the pointer associated with the winding varies with the signal. The latter is proportional to the airflow.

11. Transmitter - Air Duct Pressure
(Ref. Fig. 018)

A. Description

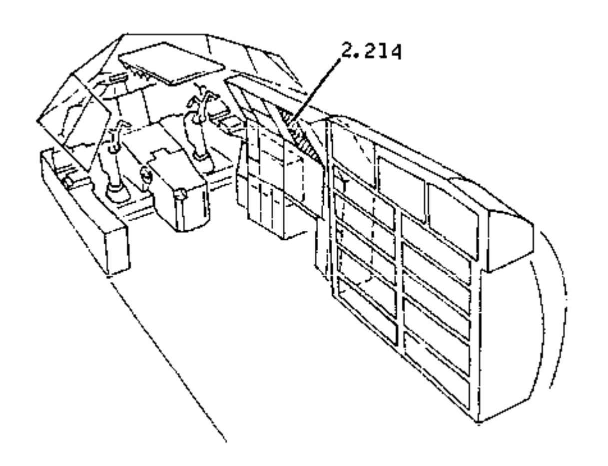
The air duct pressure transmitter measures pressure downstream of dual pressure reducing and shut off valve.
It consists mainly of :

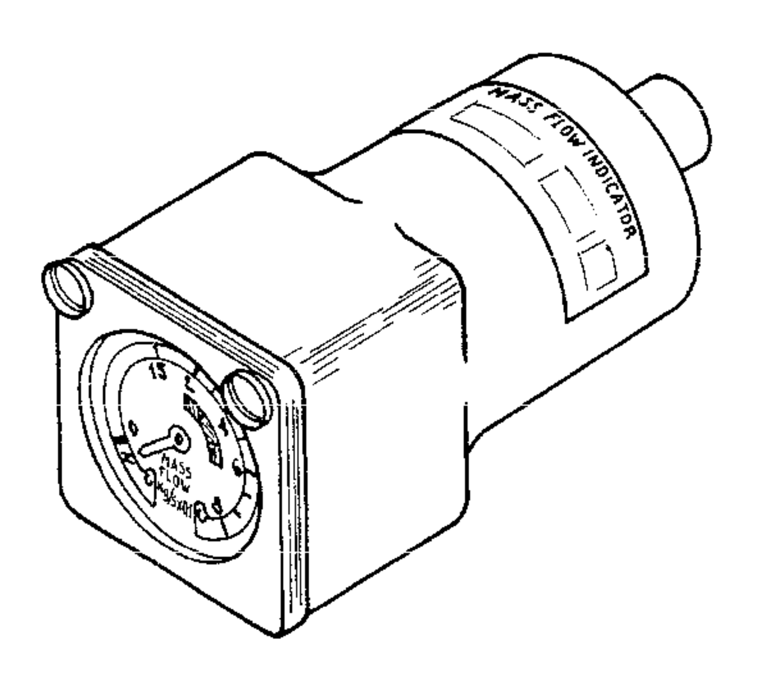
(1) A Bourdon tube (5) subjected to air pressure.

(2) An electro magnetic assembly in two parts :

(a) A fixed part made of :

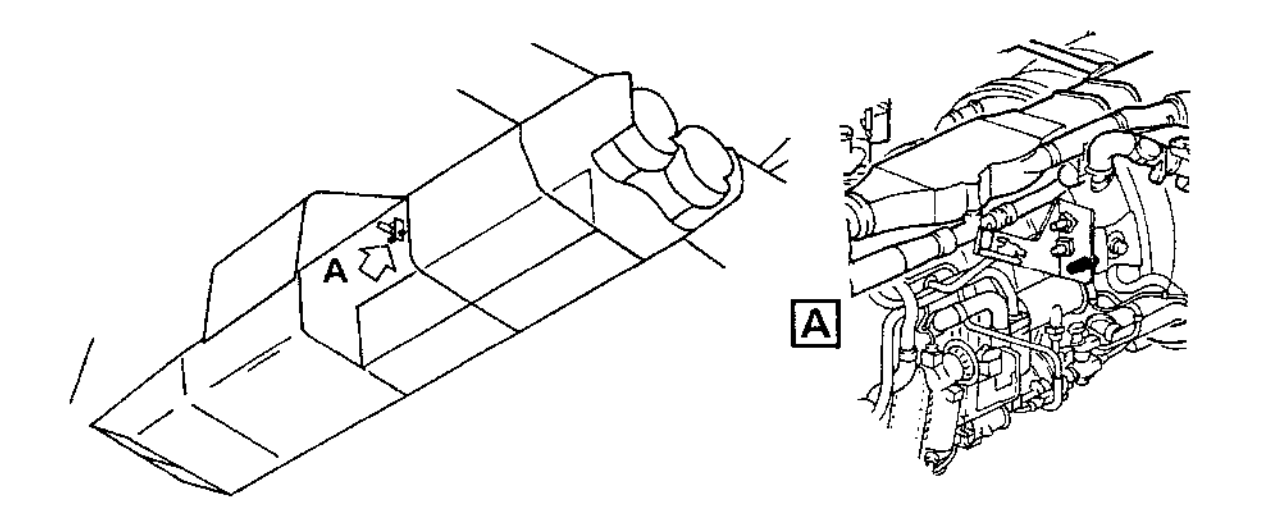
- two notched cores (3) on which two coils (8) are wound ; they form 2 inductors. The cores

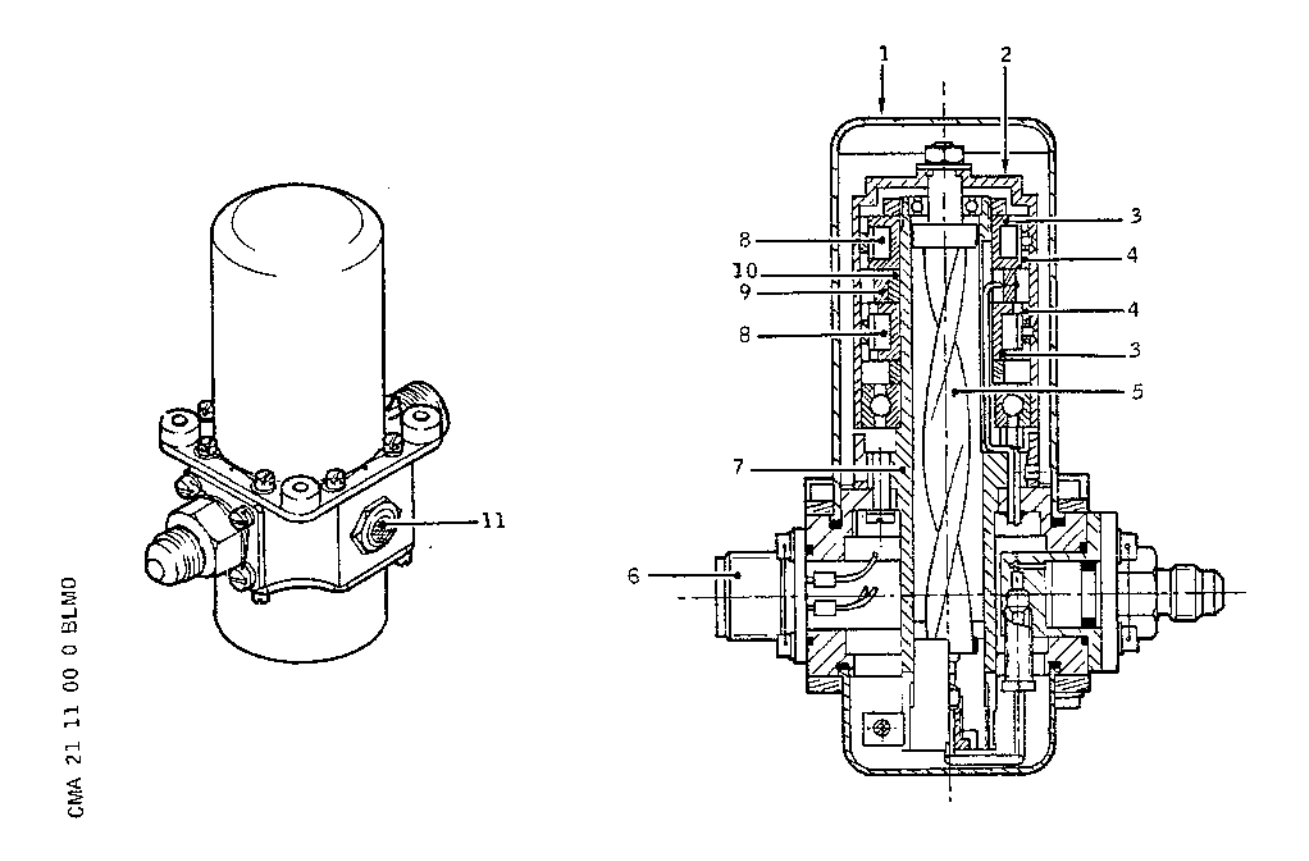




CMA 21 11 00 0 BJMO

Mass Flow Indicator
Figure 017





Air Duct Pressure Transmitter
Figure 018

are offset by one notch
- a spacer (10) located between the two cores, on which an insulating ring (9) is mounted. The ring has 2 windings connected by an electrical connector (6). The assembly is integral with guide tube (7).

(b) A moving part which consists of:

- 2 notched armatures (4) fitted inside armature (2) integral with the Bourdon tube end. The rotation of the moving part is stopped by two notches in armature (2) and by an adjustable stop.

(3) A cover (1) which receives the transmitter assembly.

(4) A filter which equalizes inner and outer pressures.

B. Operation

Under the action of air pressure, the Bourdon tube deforms and drives the electro magnetic moving part.
Each core forms, with its winding and corresponding moving armature, an induction coil, the impedance of which varies according to the position of the armature notches with respect to the core notches.

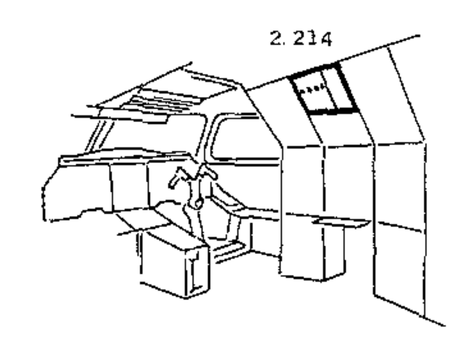
Since both cores are offset by one notch size, the impedance of one winding increases while that of the other decreases.
The two windings form the two branches of a Wheatstone bridge contained in the indicator.
When the Bourdon tube drives the moving armatures, the bridge unbalance electrical current supplies a ratiometer which displays an indication proportional to the rotation of armatures.
Measuring range of the transmitter: 0 to 100 psi.

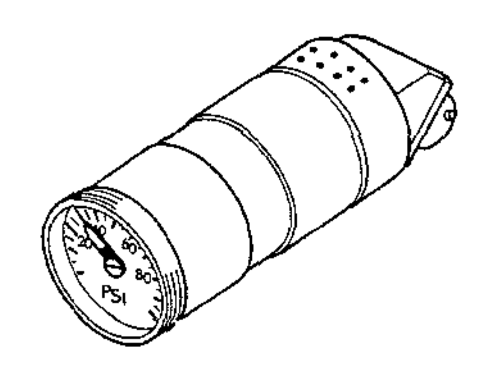
12. Indicator - Air Pressure
(Ref. Fig. 019)

A. Description

The air pressure indicators (1 for each group) are located on the Flight Engineer's panel 2-214.
They consist mainly of:

- a ratiometer mechanism
- a supply circuit
- a lighting circuit





1 2 3 4 5
13
12
11 10 9 8 7 6

INDICATOR
TRANSMITTER
D4 D3 D2 D1
R4 R3 R2 R1 R5 R6
Z1 Z2 Z3 Z4 Z5 Z6
h H h'
26V
400 Hz

CMA 21 11 00 0 BNM0

Air Pressure Indicator
Figure 019

- a casing assembly.

(1) The ratiometer mechanism consists of :

- a magnet (2), pin, gear wheel assembly. The gear wheel meshes with gear (12)
- 2 field coils (4)
- a coil (5)
- a support (3)
- a pointer (13) associated with a pin and a gear (12).

(2) The supply circuit consists of :

- a printed circuit card (8) supporting coil (9), capacitors and adjustment potentiometers
- a printed circuit card (7) supporting the rectifying circuit component
- an electrical connector (6).

(3) A lighting circuit consisting of two lamps located at the lower part of frame (11).

(4) The casing assembly consists of housing (10), cover (5) (with holes to evacuate coil heat) and frame (11) holding the protective glasses on the front face.

B. Operation

The indicator operates in conjunction with induction transmitter of which both coils Ƶ 1 and Ƶ 2 are the variable elements. When air pressure varies, the impedance of each coil also varies, one increasing, the other one decreasing. Both transmitter coils Ƶ 1 and Ƶ 2 form a Wheastone bridge, with resistors R1 and R2 for the first half wave and resistors R3 and R4 for the second half wave.
Diodes D1, D2, D3 and D4 cause electrical current to flow in the same direction through field coils Ƶ 3 and Ƶ 4.

When there is no air pressure, the Wheastone bridges are balanced and there is no difference of potential at terminals of coils Ƶ 3 or Ƶ 4. The pointer control magnet is not energized. The indicator remains in zero position.

Under the action of air pressure, the transmitter cores start rotating. The impedance of coils Ƶ 1 and Ƶ 2 varies, the bridge is unbalanced, a voltage appears at terminals of coils Ƶ 3 and Ƶ 4 ; a magnetic field h' is created. The coil consisting of Ƶ 5 and Ƶ 6 windings create a magnetic field h.

The resulting effect of both fields h and h' is a rotation

of magnet (2) ; thus indicator pointer rotates and stabilizes in a direction defined by the resultant H.

13. Switch - Overpressure
(Ref. Fig. 020)

A. Description

Each air conditioning group has 2 overpressure switches, indicating air overpressure downstream of pressure reducing and shut off valve.
Both overpressure switches are identical.

They consist mainly of :

(1) A cylindrical body (4).

(2) An adjustment assembly (2) attached to the rear part of the body. It receives the microswitch (3) and electrical connector (1).

(3) A cover (7) attached to the body by 4 screws. It holds the diaphragm (8). The coupling tube is attached to the cover.

(4) A microswitch control consisting of : a spring (5), a pressing lug (9), a stop (10) screwed on the body which enables adjustment of spring tension (5).

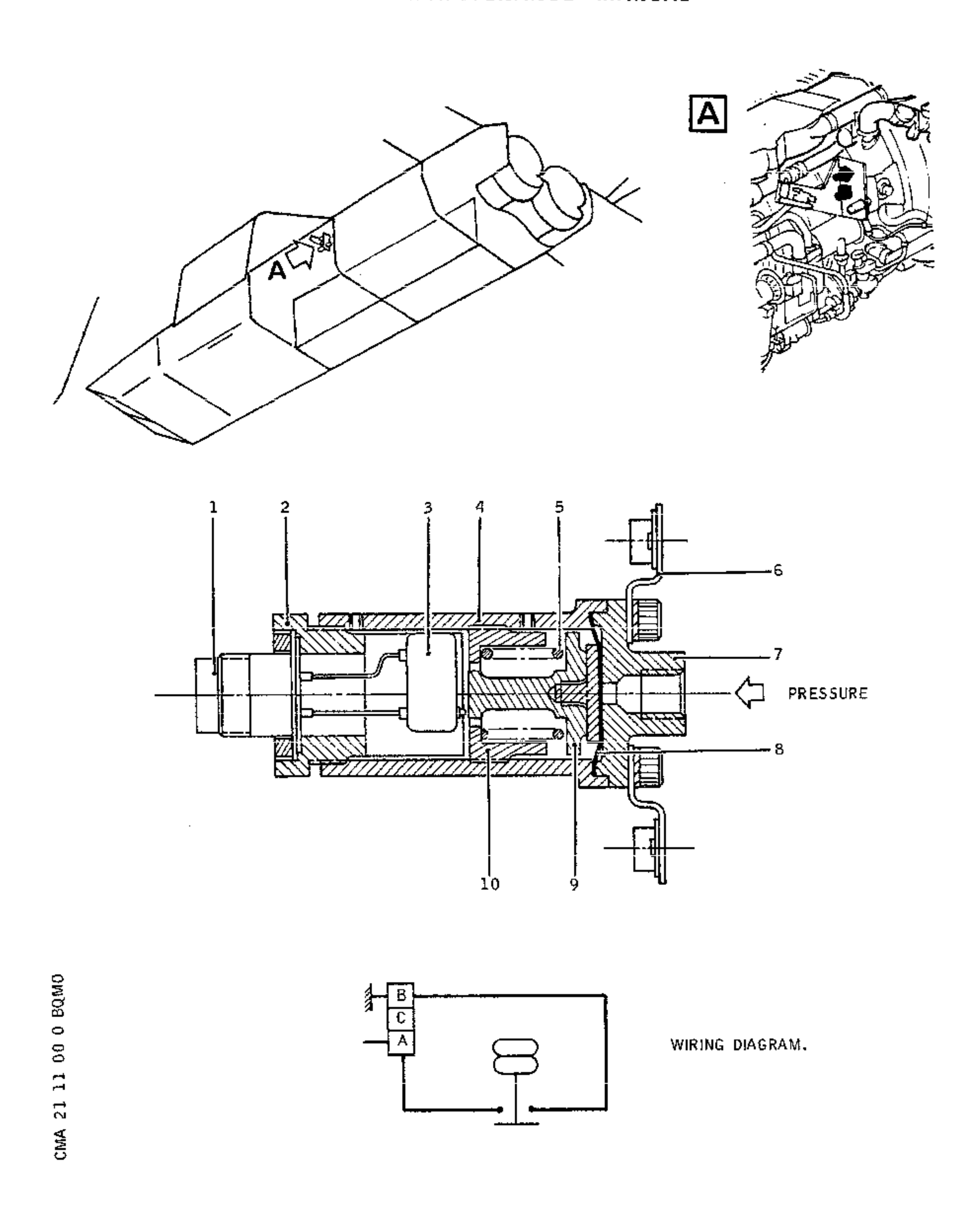
(5) An attachment plate (6).

The overpressure switch is electrically connected to OVER PRESS indicator light on Flight Engineer's panel and to pressure reducing and shut off valve stop relay.

B. Operation

When air pressure is less than 85 ± 3 psig, the spring holds the diaphragm against the cover.
The microswitch is not energized.

As soon as pressure reaches 85 ± 3 psig, it applies a force to the diaphragm which exceeds the spring force.
The pressing lug moves and activates the microswitch. The electrical circuit is closed, OVER PRESS indicator light comes on. On master warning panel AIR warning light comes on and gong sounds ; the 2 second delay fault relay 1/4H618 is energized, which cuts out electrical power supply to pressure reducing and shut off valve. The airflow is then stopped.



Overpressure Switch
Figure 020

14. Operation of Flow and Pressure Limiting System

A. Dual Pressure Reducing Shut-Off Valve 1H646

(1) Opening (Ref. Fig. 021)

Electrical power is supplied through circuit-breaker 1H611 and the valve is controlled by means of BLEED VALVE switch 1H613, when in the OPEN position. Time delay relay 1H661 and bleed valve control solenoid are energized through the contacts of A safety fault relay 1H618.
A pick-off after BLEED VALVE switch 1H613 when in OPEN position, powers the pressure limiting section of the dual pressure reducing shut-off valve. The solenoid of this section is energized when relay 1H661 is energized.

The engine when running supplies pressurized air upstream of the valve. The valve opens and BLEED VALVE magnetic indicator 1H644 displays a vertical stripe.

(2) Normal Closing by Means of BLEED VALVE Switch 1H613 in SHUT position (Ref. Fig. 022)

When BLEED VALVE switch 1H613 is placed in SHUT position, the power supply to the bleed valve and pressure limiting valve solenoids, and to relay 1H661, is cut off. When both sections of dual pressure reducing shut=off valve close, BLEED VALVE magnetic indicator 1H644 displays a horizontal stripe ; in the event of only one section closing, it will display stripes.

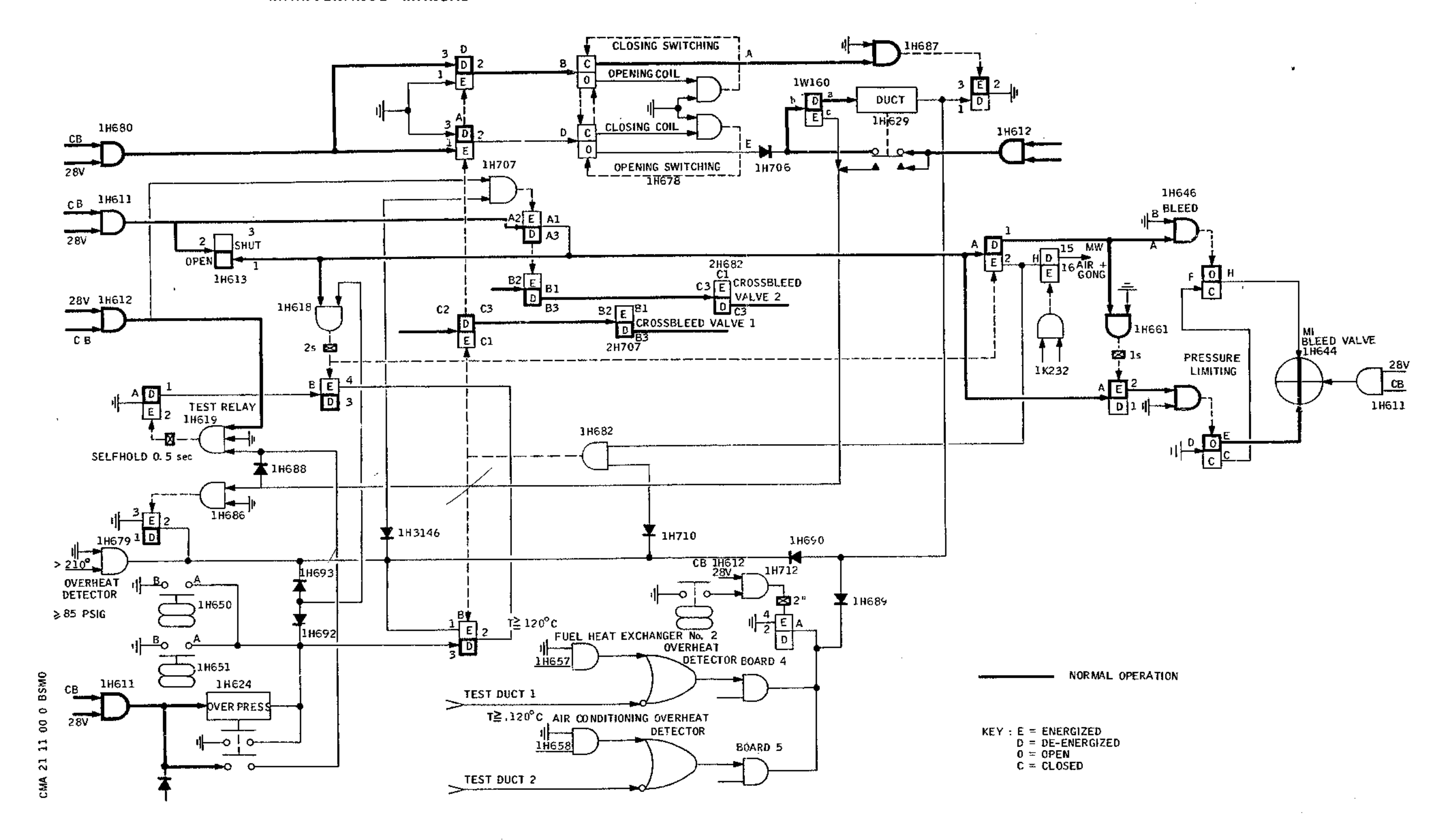
(3) Emergency Closing (Ref. Fig. 023, 024 and 025) (Ref. Fig.026 and 027)

(a) Pressure detected by overpressure switches 1H650 and 1H651

If there is detection at ≥ 85 psi, OVERPRESS caption light 1H624 comes on, and safety A fault relay 1H618 is energized. This results in :

- illumination of master warning AIR caption light
- Aural warning gong sounding
- self holding of relay in energized position
- Power supply to bleed valve solenoid and to relay 1H661 being cut off. When relay 1H661 is de-energized no power is supplied to the pressure limiting valve solenoid.

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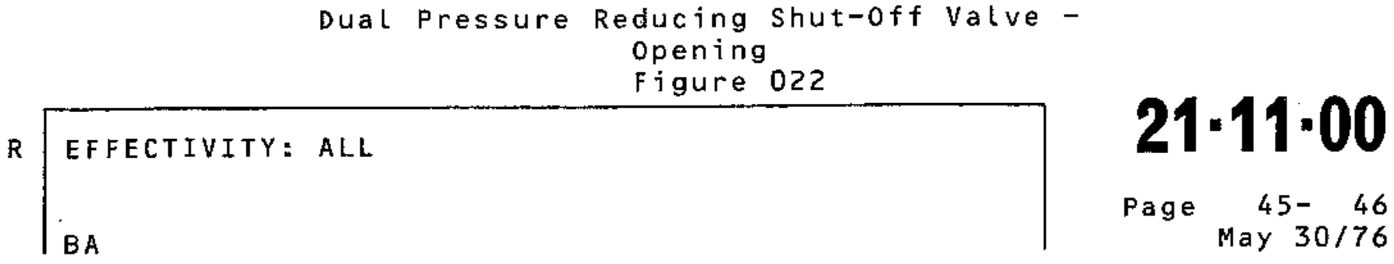


Dual Pressure Reducing Shut-Off Valve - Opening
Figure 021

NORMAL OPERATION

KEY : E = ENERGIZED
D = DE-ENERGIZED
O = OPEN
C = CLOSED

CMA 21 11 00 0 BUMO



Dual Pressure Reducing Shut-Off Valve - Opening
Figure 022

Valve 1H646 closes, and BLEED VALVE magnetic indicator displays a horizontal stripe.

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AIR CONDITIONING AND MASS FLOW CONTROL VALVE

- POWER SUPPLY
- SELFHOLD
- DETECTION

KEY E = ENERGIZED
D = DE ENERGIZED
O = OPEN
C = CLOSED

CMA 21 11 00 0 BWMO

Dual Pressure Reducing Shut-Off Valve -
Emergency Closing
Figure 023

R There are two possible ways of operating the valve again :

- Pressing OVERPRESS caption light 1H624.

  When OVERPRESS indicator light is pressed, test relay 1H619 is energized and releases relay 1H618. As overpressure is no longer detected OVERPRESS caption light goes off when released, relay 1H619 remains energized for 0.5 sec., relay 1H618 is de-energized, and the opening cycle described above is repeated. The valve opens, and BLEED VALVE magnetic indicator displays a vertical stripe again.

- Placing BLEED VALVE switch in SHUT then in OPEN position.

  When BLEED VALVE switch is placed in SHUT position, the power supply to relay 1H618 is cut off. The relay is de-energized and is no longer autoheld. BLEED VALVE switch must be returned to OPEN when OVERPRESS caption light has gone off. The valve opens in the normal way and BLEED
R VALVE magnetic indicator displays a vertical stripe again.

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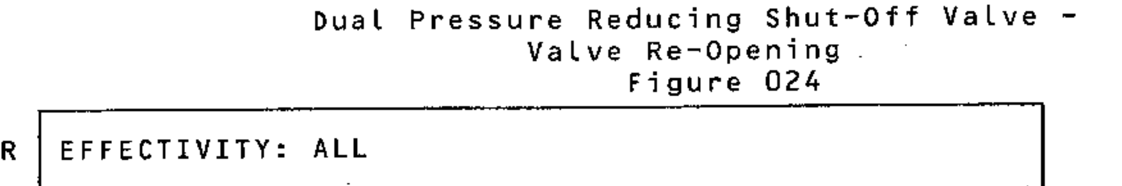
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VALVE PWR SUPPLY AFTER TEST
SELFHOLD
GROUND SIGNAL BY TEST

KEY : E = ENERGIZED
D = DE-ENERGIZED
O = OPEN
C = CLOSED

CMA 21 11 00 0 BYMO

Dual Pressure Reducing Shut-Off Valve - Valve Re-Opening
Figure 024



R EFFECTIVITY: ALL

BA

(b) Closure of dual pressure reducing shut-off valve with switch 1H613 in OPEN position, and a temperature of ≥ 210° detected by overheat detector 1H679.

When the overheat thermoswitch 1H679 detects a temperature greater than or equal to 210°C the flow and pressure limiting system is grounded and consequently :

R - DUCT warning light comes on
- System 2 crossbleed valve closes (if it was open)

2 seconds later, relay 1H618 is energized ; this relay :

- cuts out power supply to shut off valve solenoid
- cuts out power supply to relay 1H661 ; the latter cuts out power supply to pressure reducing valve
- transmits a signal which causes the single stroke gong to sound and AIR warning light to come on on master warning panel
- transmits a positive signal to relay 1H682

Relay 1H682 is energized when it is grounded by overheat thermoswitch 1H679 (temperature detected greater than or equal to 210°) and when it is supplied with positive current after closing of dual pressure reducing shut off valve. When energized, this relay causes :

- System 1 crossbleed valve to close (if it was open_
- Cabin isolation valve 1H678 to close
- The whole system to be self held in close position ; the self hold function is also associated with de-energized relay 1H619 and energized relay 1H618

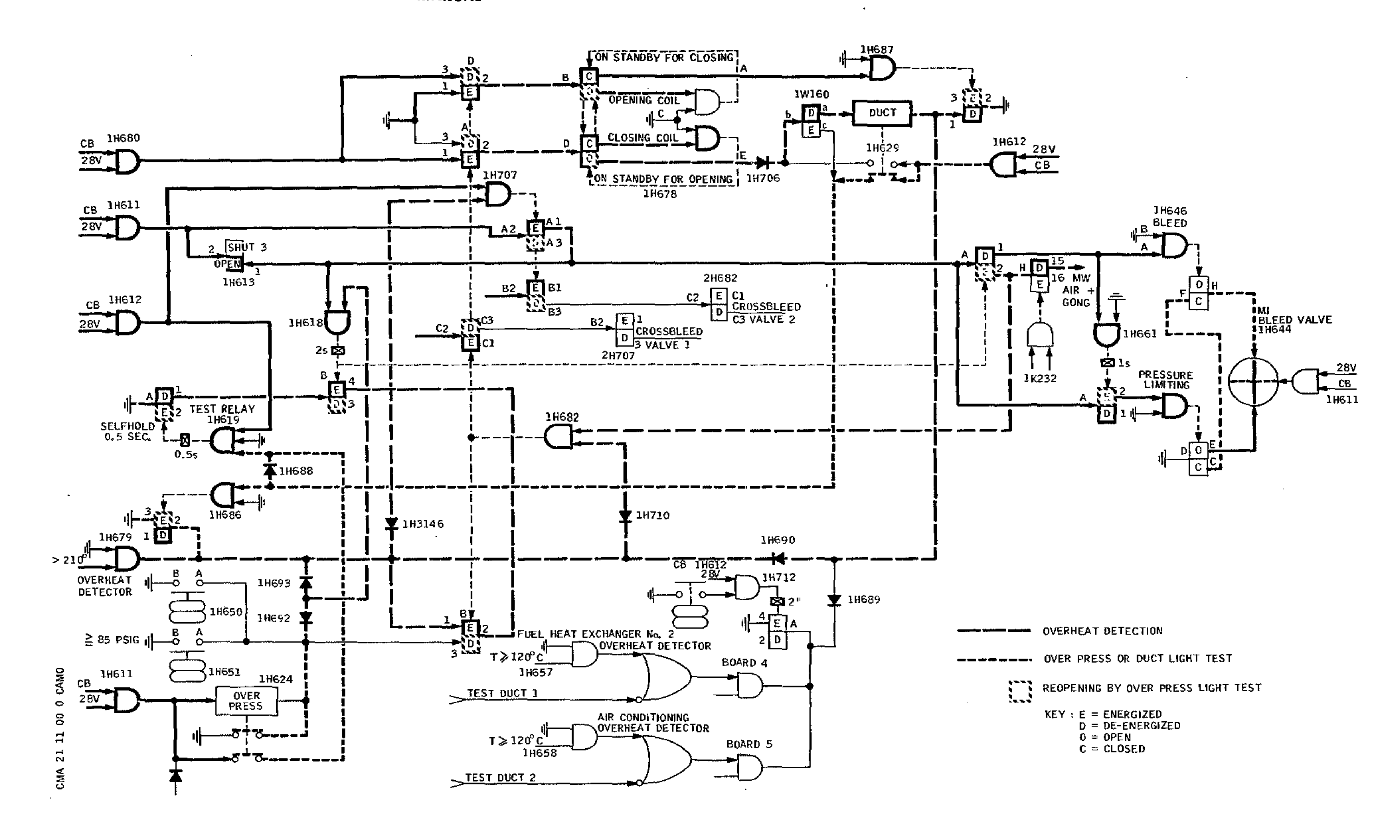
R The group shut off valve remains locked closed and
R DUCT warning light switch module illuminated.

The self-hold system is cut out by pressing
R either OVER PRESS -1H624- or DUCT -1H629- warning light switch module.
Test relay 1H619 is energized and cuts out and cancels the self-hold function (valve opening

R time delay : 0.5 seconds).
R When caption light switch module is released (if DUCT caption light is extinguished) relays 1H707, 1H682, 1H618 and 1H686 are de-energized ; de-energization of relay 1H619 is delayed by 0.5 seconds prevent relays 1H707, 1H682, 1H618, 1H686 from
R in order to being self held.
R When relay 1H707 is de-energized group 2 cross-bleed valve opens.

When relay 1H682 is de-energized, group 1 cross bleed valve opens ; this relay also causes the cabin isolation valve to open.
(time delay 3 to 5 seconds)
R Time delay relay 1H618 energizes the pressure reducing shut off valve solenoids.
AIR warning light goes off on master warning panel. The gong stops.
When the cabin isolation valve is completely
R open DUCT warning light goes off.

NOTE : The valves open only when warnings are off.



Dual Pressure Reducing Shut off Valve
Figure 025

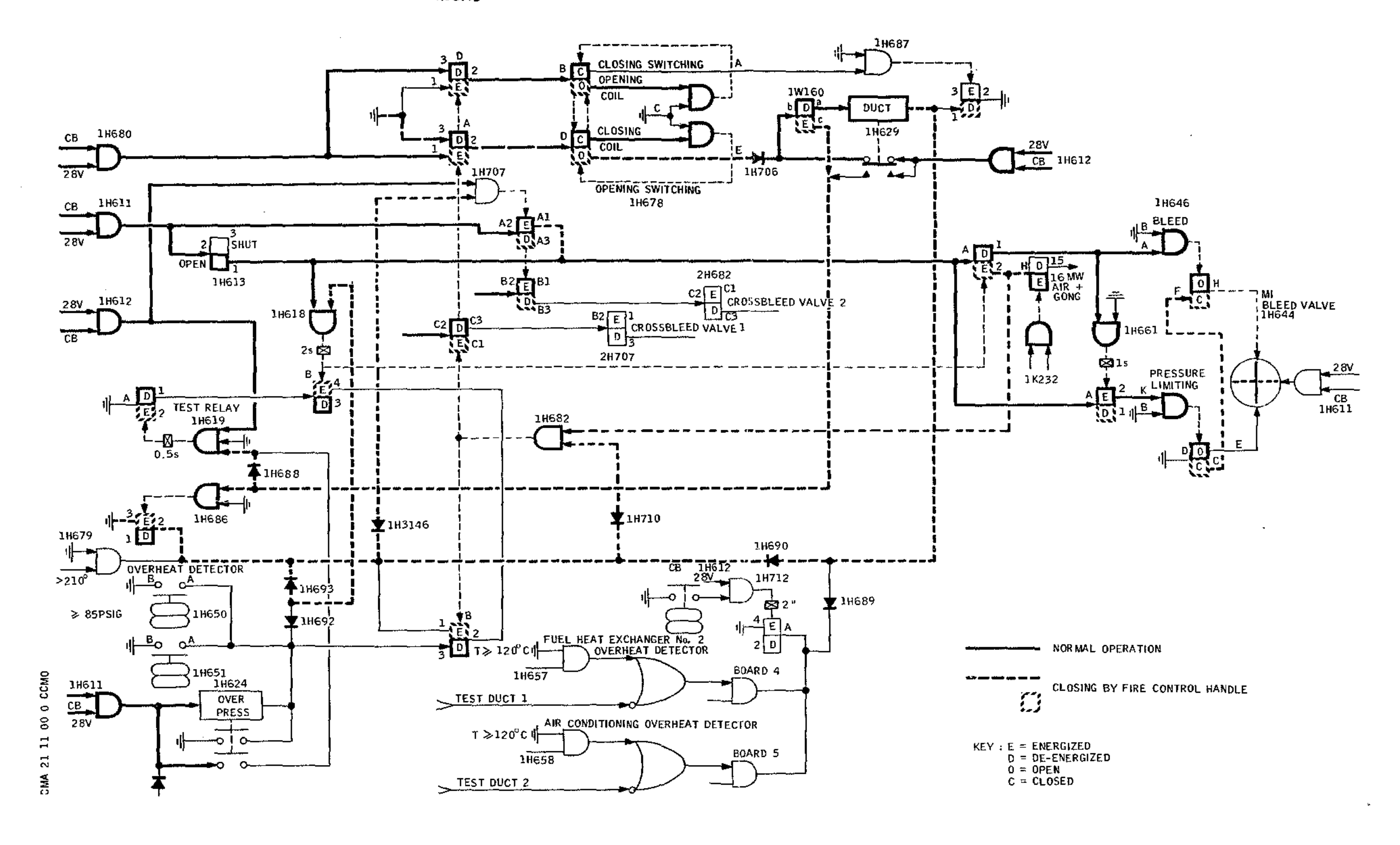
(c) Closing of dual pressure reducing shut off valve and cabin isolation valve in the event of fire or when the fire control handle is tested.

When the fire control handle is operated, relays 1H619 and 1H686 are energized.
- Relay 1H619 prevents self-hold system from functioning
- When relay 1H686 is energized, the system is grounded, which causes relay 1H707 to be energized (closing of group 2 cross bleed valve if it was open and short circuit of CROSS BLEED switch) and relay 1H618 to be also energized (closing of dual pressure reducing valve)

When relay 1H618 is energized, it supplies relay
R 1H682 which also becomes energized.
R When energized relay 1H682 causes group 1 cross bleed valve and group 1 cabin isolation valve to
R close. DUCT warning light remains extinguished.
R AIR master warning light does not come on on master warning panel and the gong does not sound
R since relay 1K232, energized by the fire control
R handle, cuts out the signal to the master warning panel.

Valve Opening
When fire control handle is returned to normal position, relay 1H686 is de-energized which cuts out relays 1H707, 1H618, 1H682 and 1H619
R from ground.
Relay 1H707 enables opening of group 2 cross bleed valve. Relay 1H682 causes the cabin isolation valve and group 1 cross bleed valve to open. Relay 1H618 causes the pressure reducing shut off
R valve solenoids to be energized and the valve to open if there is pressure upstream of the valve.

INTENTIONALLY BLANK



Dual Pressure Reducing Shut-Off Valve - Closure by Means of Fire Control Handle
Figure 026

(d) Test (without pressure) by means of OVERPRESS
R warning light, with BLEED VALVE switch in OPEN position.

R When OVER PRESS warning light is pressed, there are two results :

- Firstly an overpressure condition is simulated by a ground signal which causes OVERPRESS
R warning light to come on and energize relay 1H618.
  Relay 1H618 when energized :
  - de-energizes the bleed valve solenoid
  - cuts out the power supply to relay 1H661, which in turn cuts out the power supply to the pressure limiting valve solenoid
R - energizes AIR warning light on master warning panel and causes the gong to sound

- Secondly, time delay test relay 1H619 is signal, so that relay 1H618 is de-energized as
R soon as the test warning light is released and the system returned to its original configuration.
  BLEED VALVE magnetic indicator 1H644 continues to display a horizontal stripe.

R If pressure exists upstream of the dual pressure reducing shut-off valve, pressing the
R OVERPRESS warning light causes the same results, electrically, except as regards BLEED VALVE magnetic indicator 1H644, which moves from the
R vertical to the horizontal stripe position (valve closed) when both solenoids are no longer
R energized. When OVERPRESS warning light is released, it goes off, and BLEED VALVE magnetic
R indicator returns to the vertical stripe valve
R open position, as the bleed valve and pressure limiting valve solenoids are energized again.

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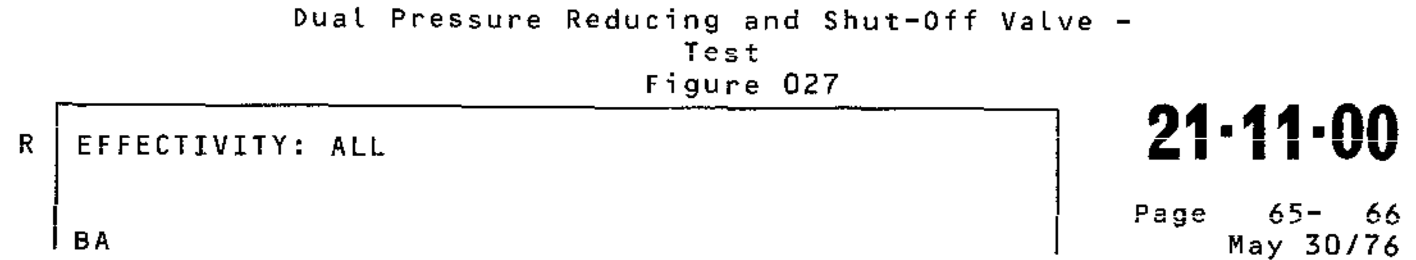
CLOSING SWITCHING
OPENING
COIL
CLOSING
COIL
OPENING SWITCHING
1H678
1H687
1W160
DUCT
1H629
1H706
1H612
1H680
1H611
1H707
SHUT 3
OPEN
1H613
1H618
2H682
CROSSBLEED VALVE 2
2H707
CROSSBLEED VALVE 1
1H646
BLEED
MW
AIR +
GONG
1K232
1H661
PRESSURE
LIMITING
MI
BLEED VALVE
1H644
TEST RELAY
1H619
SELFHOLD 0.5 sec
1H688
1H686
1H682
1H710
1H3146
1H690
1H689
1H679
> 210°
OVERHEAT
DETECTOR
1H650
≧ 85PSIG
1H651
1H693
1H692
1H624
OVER
PRESS
1H712
FUEL HEAT
EXCHANGER No. 2
OVERHEAT DETECTOR
1H657
TEST DUCT 1
BOARD 4
AIR CONDITIONING OVERHEAT DETECTOR
1H658
TEST DUCT 2
BOARD 5

TEST WITH PRESSURE
TEST WITH NO PRESSURE

KEY : E = ENERGIZED
D = DE-ENERGIZED
O = OPEN
C = CLOSED

CMA 21 11 00 0 CEMO

Dual Pressure Reducing and Shut-Off Valve -
Test
Figure 027



B. Operation of Air Conditioning Valve 1H645 and Mass Flow Control Valve 1H880.

The electrical operation of the two valves is covered jointly, although they do not have the same pneumatic functions, as both valves are controlled by the same switch, COND VALVE 1H866, and the same test and safety relay 1H614.

(1) Normal Closing : COND VALVE switch 1H866 in OFF position, no fuel pressure (Ref. Fig. 028).

R - When switch 1H866 is in OFF position, it energizes
R relay 1H901 which cuts off power supply to relay
R 1H906, which in turn energizes the mass flow control
R valve 1H880 closing solenoid.
- The lack of fuel pressure causes relays 1H664 and 1H666 to disconnect relay 1H614 from the ground. This relay powers :
R - The rapid closing air conditioning valve 1H645
R solenoid.
- The ball-latched normal closing solenoid (20 sec. delay)

- COND VALVE magnetic indicator 1H874 (air conditioning valve position) displays a horizontal stripe.
R - The mass flow control valve closing solenoid is ener-
R gized through the contact of de-energized relay 1H906.
- Both valves are closed.

(2) Normal Closing : COND VALVE switch 1H866 in ON position, no fuel pressure (Ref. Fig. 029)

Relays 1H664 and 1H666 disconnect relay 1H614 from
R ground. This relay remains de-energized and in turn energizes :

R - The rapid closing air conditioning valve solenoid.
- The ball-latched normal closing solenoid of the air conditioning valve.

It also cuts off the power supply to the mass flow control valve control relay, thus energizing the mass flow control valve closing solenoid.

R (3) Normal Opening : COND VALVE switch 1H866 in ON position with fuel pressure and upstream air pressure (Ref. Fig. 030)

Relay 1H614 is energized.

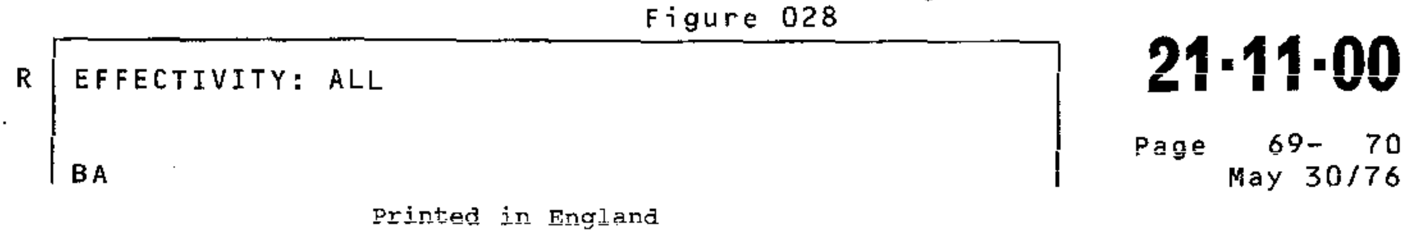
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TEST RELAY
1H675 1H676
28VDC CB 1H667
C2 E D C1 C3
1H677 B1 E B2 B3 D B3 B2 E B1
1H664 1Q846
A3 D A2 A1 E
FLT GND G301
1H668
1H666 1Q847
1H696 B3 B2 D E B1
SPECIAL SMOKE FAULT RELAY
DUCT 1H689
1H623 1H621 1H620
SECOND PRIM
1H659 ΔP ≥ 7PSIG
BOARD 5 BOARD 4 BOARD 2 BOARD 1
BOARD 5 TEST RELAY
BOARD 4 TEST RELAY
BOARD 2 TEST RELAY
BOARD 1 TEST RELAY
1H658 T° ≥ 120° C
1H657 T° ≥ 120° C
1H655 T° ≥ 210° C
1H654 T° ≥ 220° C
1H643 1H642 1H640 1H639 1H638
DUCT 2 DUCT 1 SECOND PRIM FLOW FUEL COND.
CB 1H862 28VDC
CB 1H612 28VDC 1H614
COND. VALVE SWITCH 1H866
BOOST ON OFF
1H907 1H908 1H906 1H703 1H901
ENERGIZED CLOSED 1H880 C BOOST O
OPENING
IMMEDIATE CLOSURE
BALL-LATCHED NORMAL CLOSING
MW
1H645
1H619 1H612
OVER PRESS TEST
1H688 1H641
BOARD 3
COND. VALVE M.I.
1H874 COND. VALVE

KEY : E = ENERGIZED
D = DE-ENERGIZED
C = CLOSED
O = OPEN

CMA 21 11 00 0 CGM0

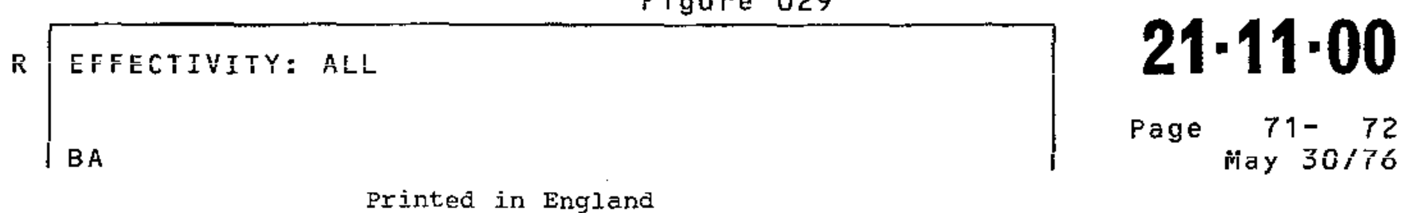
Air Conditioning Valve and Mass Flow Control
Valve - Normal Closing
Figure 028



KEY : E = ENERGIZED
D = DE-ENERGIZED
C = CLOSED
O = OPEN

CMA 21 11 00 0 CJM0

Air Conditioning Valve and Mass Flow Control
Valve - Closing with no Fuel Pressure
Figure 029


R EFFECTIVITY: ALL

BA

Printed in England

Relay 1H906 is energized through stage C of COND VALVE switch 1H866 in ON position, and :

- Cuts off power supply to the mass flow control valve solenoid, thus enabling valve opening.
- Cuts off the power supply to the ball-latched solenoid of air conditioning valve 1H645.
- Energizes the air conditioning valve solenoid (15 sec. time delay). When the valve has opened, COND VALVE magnetic indicator 1H874 displays a horizontal stripe.

(4) Air Conditioning Valve and Mass Flow Control Valve Closing by Means of Secondary Heat Exchanger Overheat Detector 1H655 (Ref. Fig. 031).

R When overheat detector 1H655 detects a temperature of ≥ 210°, printed circuit card 2 in overheat detection box 1H649 grounds SECOND EXCH caption light 1H627 and relay 1H621, which is then energized.
This relay :

- R Disconnects relay 1H614 from ground. The relay is thus de-energized, and energizes the master warning system (AIR warning light and gong).
- R Energizes the rapid closing solenoid, and the ball-latched normal closing solenoid of the air conditioning valve.
- De-energizes relay 1H906, which then energizes the mass flow control valve closing solenoid.

COND VALVE magnetic indicator 1H874 displays a horizontal stripe.
Relay 1H621 is self held by means of de-energized relay 1H619, and energized relay 1H621.

R By placing COND VALVE switch 1H866 in OFF position, relay 1H901 is energized, which cuts off the self hold and cancels the warnings. If SECOND EXCH warning light 1H627 goes off, the overheat condition has disappeared.

In this event, the two valves can be operated again by placing COND VALVE switch 1H866 in ON position. The opening cycle is the same as for normal opening (Ref. para. B (3)).

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TEST RELAY 1H676

COND. VALVE SWITCH 1H866

ENERGIZED CLOSED

1H880

BOOST

OPENING

IMMEDIATE CLOSURE

BALL-LATCHED NORMAL CLOSING

COND. VALVE M.L. 1H874

SPECIAL SMOKE FAULT RELAY

DUCT

SECOND

PRIM

ΔP≥7PSIG

BOARD 5

BOARD 4

BOARD 2

BOARD 1

BOARD 5 TEST RELAY

BOARD 4 TEST RELAY

BOARD 2 TEST RELAY

BOARD 1 TEST RELAY

T° ≥ 120° C

T° ≥ 120° C

T° ≥ 210° C

T° ≥ 220° C

OVER PRESS TEST

BOARD 3

COND.

DUCT 2

DUCT 1

SECOND

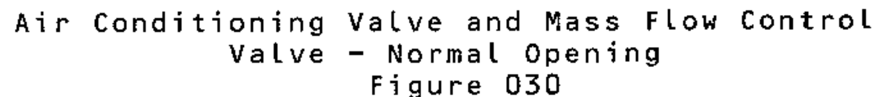
PRIM

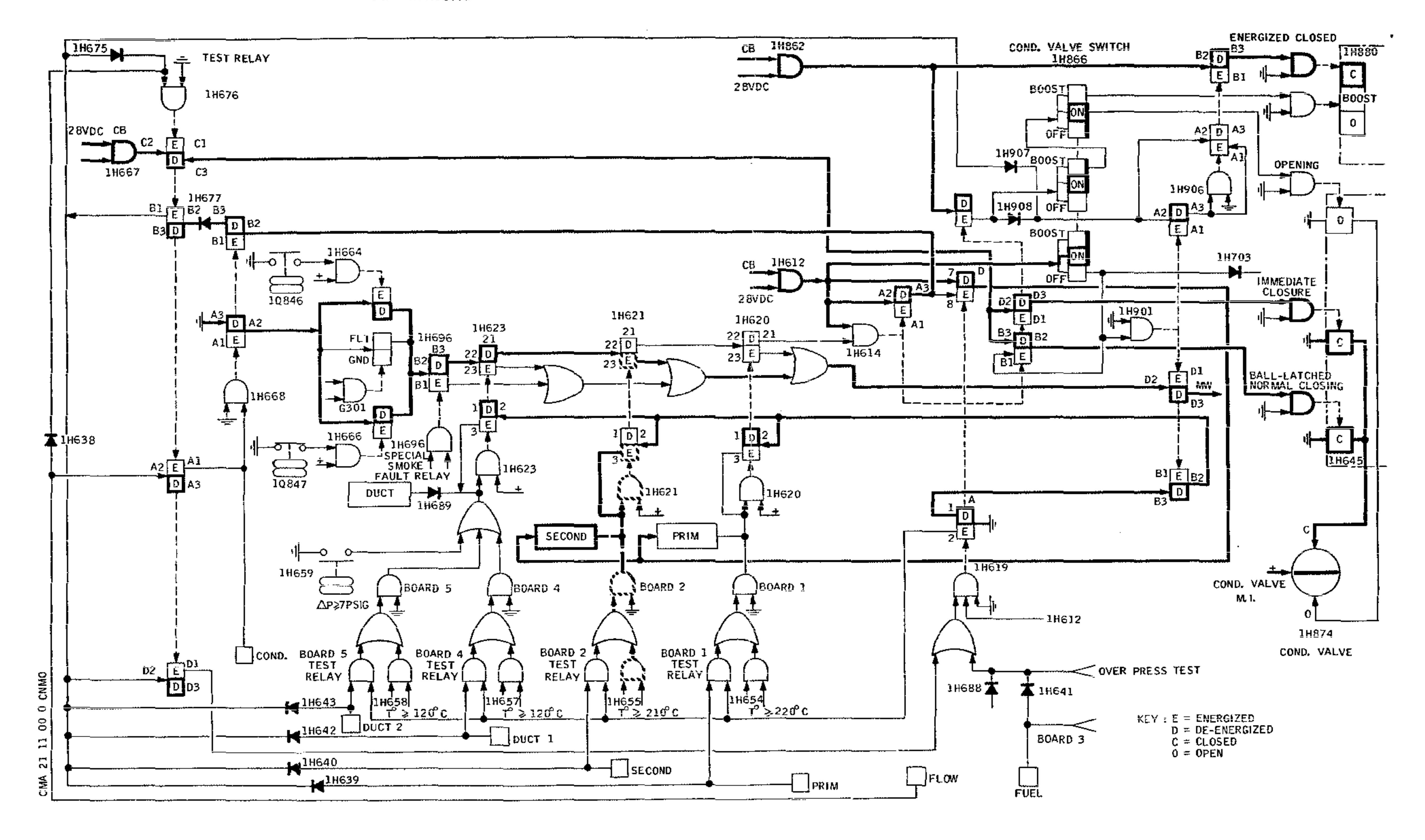
FLOW

FUEL

KEY : E = ENERGIZED
D = DE-ENERGIZED
C = CLOSED
O = OPEN

CMA 21 11 00 0 CLM0


Air Conditioning Valve and Mass Flow Control
Valve - Normal Opening
Figure 030



Air Conditioning Valve and Mass Flow Control Valve - Closing in the Event of Overheat
Figure 031

(5) Air Conditioning Valve and Mass Flow Control Valve Closing by Means of Primary Heat Exchanger Overheat Detector 1H654 (Ref. Fig. 032).

When overheat detector 1H654 detects a temperature of
R $\geq$ 120°C, printed circuit card 1 in overheat detection
R box 1H649 grounds PRIM EXCH warning light 1H626 and relay 1H620, which is then energized.
This relay :

- Disconnects relay 1H614 from the ground. The relay is then de-energized, and triggers the master warning system (AIR warning light and gong).
- R Energizes the rapid closing solenoid and the ball-latched normal closing solenoid of the air conditioning valve.
- De-energizes relay 1H906, which then energizes the mass flow control valve closing solenoid.

COND VALVE magnetic indicator 1H874 displays a horizontal stripe.
Self hold is ensured by means of de-energized relay 1H619, de-energized relay 1H901, and relay 1H620.

By placing COND VALVE switch 1H866 in OFF position, relay 1H901 is energized, which cuts off the autohold
R and cancels the warnings. If PRIM EXCH warning light 1H626 goes off, the overheat condition has disappeared.

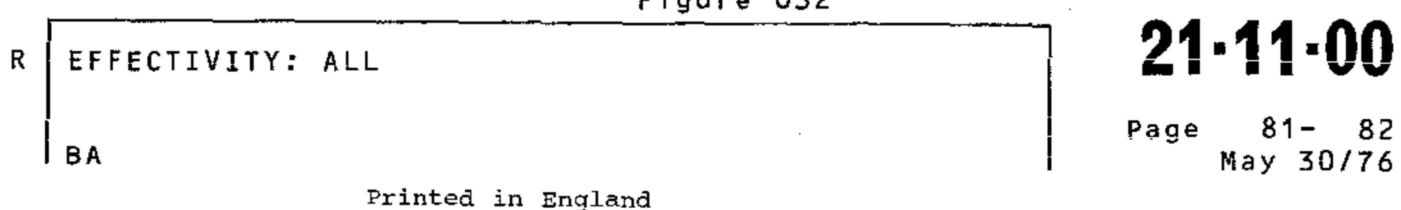
In this case, the two valves can be operated again by placing COND VALVE switch 1H866 in ON position. The opening cycle is the same as for normal opening (Ref. para. B (3)).

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KEY : E = ENERGIZED
D = DE-ENERGIZED
C = CLOSED
O = OPEN

CMA 21 11 00 0 CQM0

Air Conditioning Valve and Mass Flow Control
Valve - Closing in the Event of Overheat
Figure 032



(6) Air Conditioning Valve and Mass Flow Control Valve Closing by Means of Either Air Conditioning Overheat Detector 1H658, or Fuel Heat Exchanger Overheat Detector 1H657, or Cold Air Unit (CAU) Outlet Overpressure Pressure Switch (Ref. Fig. 033)

If either overheat detector (1H658 connected to overheat detection box circuit board 5, or 1H657 connected to card 4) detects ≥ 120°C, or if pressure switch
R 1H659 detects a Δ P ≥ 10 psig, they emit a ground signal which energizes relay 1H623, which thus illuminates DUCT warning light 1H629.

Relay 1H623 disconnects relay 1H614 from ground and grounds AIR master warning light and aural warning gong.

When de-energized, relay 1H614 :

- Disconnects relay 1H906 from the ground ; this relay then closes the mass flow control valve.
- Energizes air conditioning valve rapid closing solenoid.
- Energizes the ball-latched normal closing solenoid.

Self hold in the closed position is ensured by de-energized relay 1H619, de-energized relay 1H901 and energized relay 1H623.

When the air conditioning valve has closed, COND VALVE magnetic indicator displays a horizontal stripe.

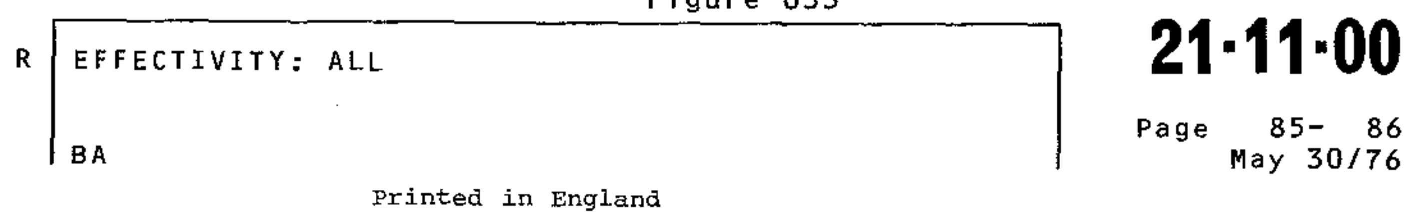
When COND VALVE switch 1H866 is placed in the OFF position, relay 1H901 is energized and cancels the master warnings and self hold. After they have disappeared, DUCT warning light goes off, and it is then possible to operate both valves again by placing COND VALVE switch 1H866 in ON position. The opening cycle is identical to the normal cycle (Ref. para. B (3)).

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Air Conditioning Valve and Mass Flow Control
Valve - Closing in the Event of Overheat
Figure 033



C. Operation of Air Conditioning Valve and Mass Flow Control Valve Safety Circuit Tests

(1) DUCT 1 Test (Ref. Fig. 034)

When overheat safety rotary test switch H648 is placed in DUCT 1 position, and AIR COND TEST switch H647 is placed in TEST position, the detection bridge
R in card 4 of overheat safety box 1H649 is unbalanced, and test relay 1H676 and relay 1H619 are ener-
R gized. Card 4 grounds DUCT warning light, which then comes on, and relay 1H623, which is then energized.

R Relay 1H623 disconnects relay 1H614 from ground, and
R grounds AIR master warning light and aural warning gong

Relay 1H614, when de-energized, cuts off the normal power supply to relay 1H906. This relay, together with energized test relay 1H676, is powered by the test selector ; consequently, the mass flow control valve does not have to be closed.

At the same time, test relay 1H676 cuts off the power
R supply to air conditioning valve solenoids. Both valves remain open, and COND VALVE magnetic indicator 1H874 continues to display a vertical stripe.

Relay 1H619, when energized, cancels the self hold.

As soon as AIR COND TEST switch H647 is placed in OFF position, relay 1H623 is de-energized. DUCT and AIR warning lights go off, the aural warning gong stops, relay 1H614 is energized and powers relay 1H906 again. This maintains the mass flow control valve open.

Test relay 1H676 is de-energized, followed 0.5 sec. later by relay 1H619. This prevents relay 1H623 from
R being autoheld and disconnects card 4 test relay from the ground.

(2) DUCT 2 Test (Ref. Fig. 034)

When overheat safety rotary test switch H648 is placed in DUCT 2 position, and when AIR COND TEST switch H647 is placed in TEST position, the detection
R bridge on card 5 of overheat safety box 1H649 is unbalanced, and test relay 1H676 is energized. Card 5
R grounds DUCT warning light, which then comes on, and relay 1H623, which is then energized. The test then proceeds in the same manner as for the DUCT 1 test

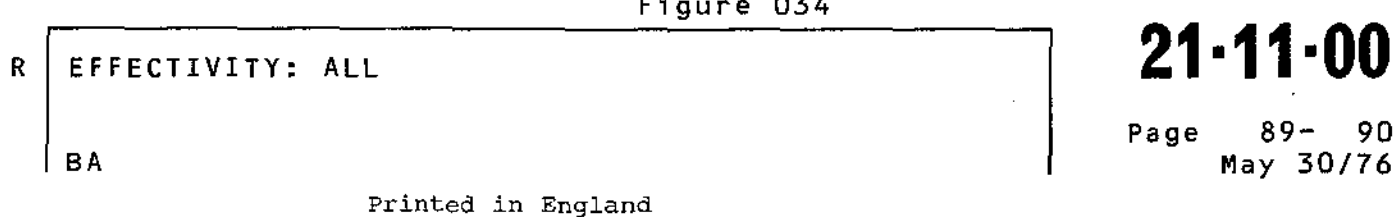
(Ref. para. C (1)).

TEST RELAY
1H675
1H676
CB
28VDC
1H667
1H677
1H664
1Q846
1H668
1H638
1H666
1Q847
COND.
FLT
GND
G301
1H696
1H623
SPECIAL SMOKE FAULT RELAY
DUCT
ΔP≥7PSIG
1H659
BOARD 5
BOARD 4
BOARD 2
BOARD 1
BOARD 5 TEST RELAY
BOARD 4 TEST RELAY
BOARD 2 TEST RELAY
BOARD 1 TEST RELAY
1H658
1H657
1H655
1H654
T°≥120°C
T°≥120°C
T°≥210°C
T°≥220°C
1H643
1H642
1H640
1H639
DUCT 2
DUCT 1
SECOND
PRIM
1H621
1H620
1H862
1H612
1H614
COND. VALVE SWITCH
1H866
BOOST
ON
OFF
1H907
1H908
1H906
ENERGIZED CLOSED
1H880
C
BOOST
O
OPENING
1H645
1H703
IMMEDIATE CLOSURE
1H901
BALL-LATCHED NORMAL CLOSING
MW
COND. VALVE M.I.
1H874
1H619
1H612
OVER PRESS TEST
BOARD 3
1H688
1H641
FLOW
FUEL

KEY : E = ENERGIZED
D = DE-ENERGIZED
C = CLOSED
O = OPEN

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Air Conditioning Valve and Mass Flow Control
Valve - Test
Figure 034


R EFFECTIVITY: ALL

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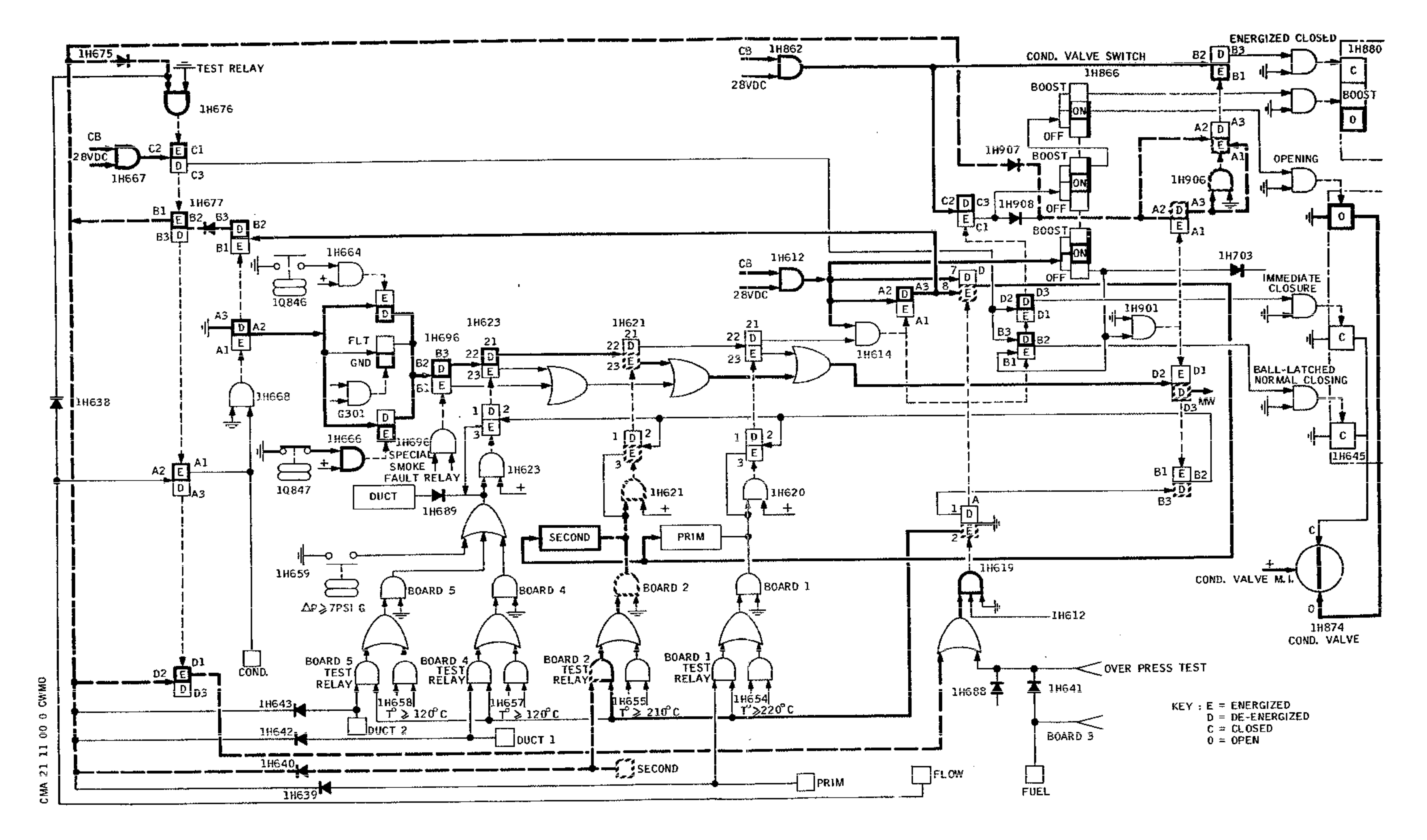
(3) SEC EXCH Test (Ref. Fig. 035)

When overheat safety rotary test switch H648 is placed in SECOND position, and when AIR COND TEST switch H647 is placed in TEST position :

- The detection bridge in board 2 of overheat safety box 1H649 is unbalanced, thus energizing relay 1H621 and illuminating SECOND EXCH caption light.
- Test relay 1H676 is energized and energizes in turn relay 1H619 and relay 1H906. This enables the mass flow control valve to remain open.
- R R Relay 1H676, when energized, prevents the rapid closing solenoid and the ball-latched normal opening solenoid from being powered. This prevents the air conditioning valve from closing.
- Relay 1H621 disconnects relay 1H614 from the ground, thus illuminating AIR master warning light and causing the gong to sound.
- Relay 1H619, when energized, grounds board 2 test relay and as it is delayed at opening, prevents the warning from being self held. When AIR COND TEST switch H647 is placed in OFF position, board 2 warning is cancelled. SECOND EXCH warning light goes off, relay 1H621 is de-energized, relay 1H614 is energized and cancels the master warnings (AIR R warning light, and gong). Relay 1H676 is de-energized, and relay 1H906 remains energized. 0.5 sec. later, relay 1H619 is de-energized, thus avoiding self hold of the simulated warnings.

Both valves have remained open, and COND VALVE magnetic indicator displays a vertical stripe.

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Air Conditioning Valve and Mass Flow Control Valve - Test
Figure 035

(4) PRIM EXCH Test (Ref. Fig. 036)

When overheat safety rotary test switch H648 is placed in PRIM position, and when AIR COND TEST H647
R switch is placed in TEST position :

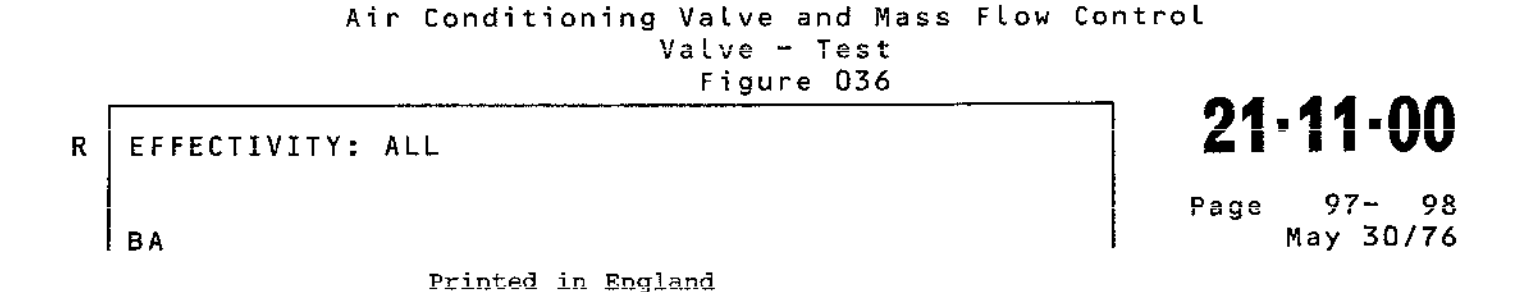
R - The detection bridge on card 1 of overheat safety box 1H649 is unbalanced, thus illuminating PRIM EXCH
R warning light, and energizing relay 1H620. This relay trips the master warning system (AIR warning light and gong).
- Test relay 1H676 is energized and energizes relay 1H619. This relay grounds card 1 test relay and
R prevents selfhold of the warnings. Relay 1H614 is de-energized.
- A substitute power supply enables relay 1H906 to remain energized, thus maintaining the mass flow control valve open.
- Relay 1H676, when energized, prevents power from
R being supplied to the rapid closing and ballatched normal closing solenoids. This prevents closure of the air conditioning valve.
- When AIR COND TEST switch H647 is placed in OFF position, board 1 detection bridge in overheat safety box 1H649 is balanced again, with the result that PRIM EXCH caption light goes off. Relay 1H620 is de-energized, thus cancelling the master warnings (AIR warning light and gong), and relay 1H614 is again.
- Test relay 1H676 is de-energized. Relay 1H906 remains energized. The mass flow control valve remains open.
- Relay 1H619 is de-energized 0.5 sec. later, thus avoiding self hold of the warnings caused by the test The air conditioning valve remains open.

INTENTIONALLY BLANK

1H675
TEST RELAY
1H676
CB 1H667
28VDC
B1 1H677 B3
B3 B2 B2
B1
1H664
1Q846
A3 A2
A1
FLT
GND
G301
1H668
1H696
1H666
1Q847
1H638
A2 A1
A3
1H623
1H621
1H620
22 21 23
B3 B2 B1
SPECIAL SMOKE
FAULT RELAY
DUCT
1H689
ΔP≥7PSIG
1H659
SECOND
PRIM
BOARD 5
BOARD 4
BOARD 2
BOARD 1
COND.
BOARD 5 TEST RELAY
BOARD 4 TEST RELAY
BOARD 2 TEST RELAY
BOARD 1 TEST RELAY
1H658
1H657
1H655
1H654
T° ≥ 120°C
T° ≥ 120°C
T° ≥ 210°C
T° ≥ 220°C
D2 D1
D3
1H643
1H642
1H640
1H639
DUCT 2
DUCT 1
SECOND
PRIM
FLOW
FUEL
CB 1H862
28VDC
COND. VALVE SWITCH
1H866
BOOST ON OFF
1H907
1H908
C2 C3 C1
CB 1H612
28VDC
A2 A3 A1
1H614
7 D 8
D2 D3 D1
B3 B2 B1
1H901
1H703
1H906
A2 A3 A1
B3 ENERGIZED CLOSED
B2 B1
1H880
C
BOOST
O
OPENING
1H645
IMMEDIATE CLOSURE
BALL-LATCHED NORMAL CLOSING
D2 D1 D3
MW
B1 B2 B3
1H619
1H612
OVER PRESS TEST
1H688
1H641
BOARD 3
COND. VALVE M.I.
1H874
KEY : E = ENERGIZED
D = DE-ENERGIZED
C = CLOSED
O = OPEN

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Air Conditioning Valve and Mass Flow Control
Valve - Test
Figure 036



R | EFFECTIVITY: ALL

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(5) COND Test (Ref. Fig. 037)

When overheat safety rotary test switch H648 is placed in COND position, when AIR COND TEST switch H647 is placed in TEST position, relay 1H668 is energized and disconnects relay 1H614 from the ground.

This relay, which is then de-energized :

- Cuts off the power supply to relay 1H906, thus allowing power to be supplied to the mass flow control valve closing solenoid.
R - Powers the rapid closing solenoid of the air conditioning valve.
- Powers the ball-latched normal closing solenoid of the air conditioning valve.

COND VALVE magnetic indicator displays a horizontal stripe, indicating that the air conditioning valve is shut. The master warnings (AIR warning light and gong) do not operate.

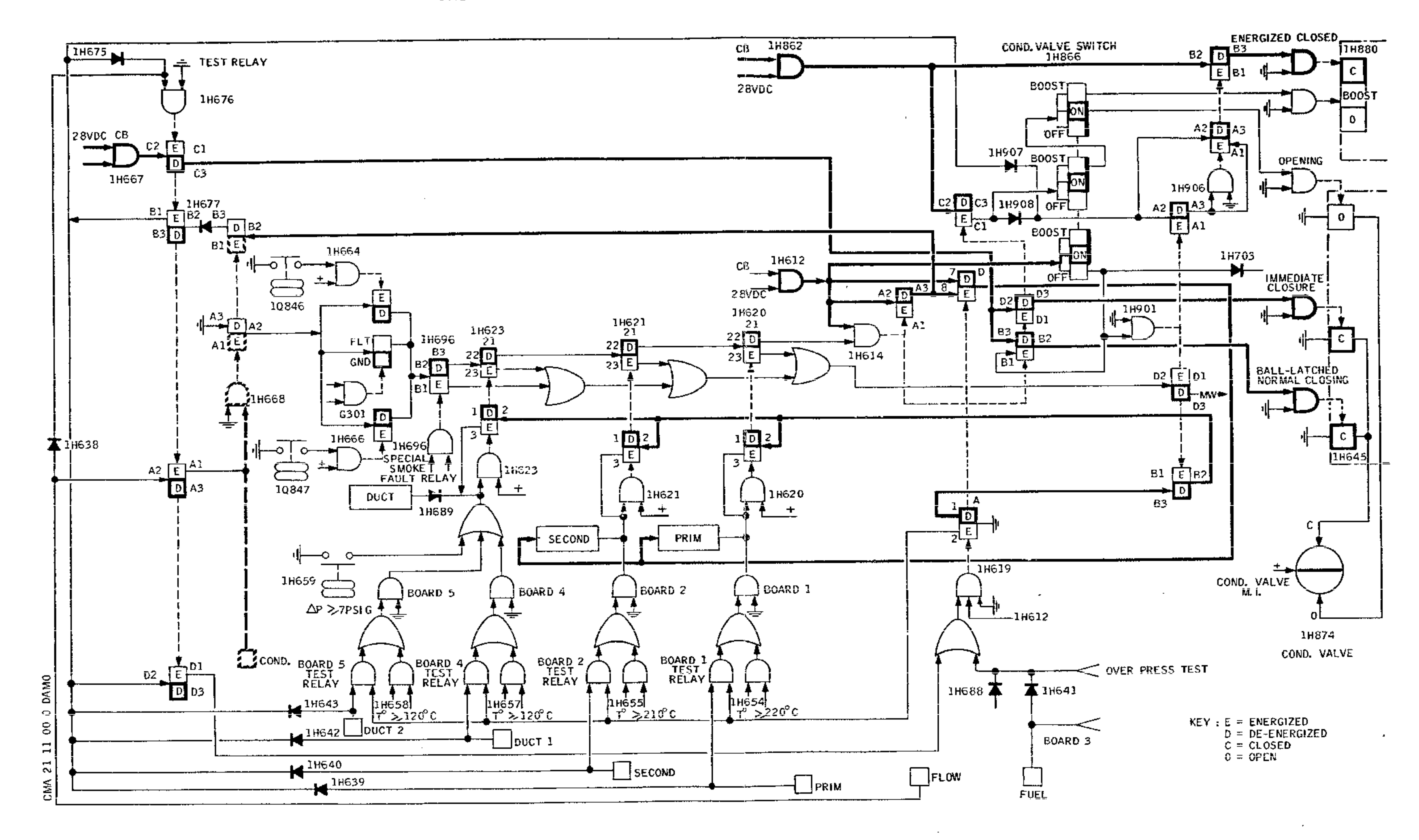
When AIR COND TEST switch H647 is in OFF position.

- Relay 1H668 is de-energized, relay 1H614 is energized again and de-energizes the ball-latched normal closing solenoid and the rapid closing solenoid of the air conditioning valve. R
- Relay 1H906 is energized again, and the mass flow control valve opens.
- The air conditioning valve is powered open. Both valves are therefore open.
- COND VALVE magnetic indicator 1H874 resumes its vertical stripe position.

(6) Test flow (Ref. Fig. 038)

When overheat safety rotary test switch H648 is placed in FLOW position, and when AIR COND TEST switch H647 is placed in TEST position, test relay 1H676 is energized and fault relay 1H614 is de-energized. Energization of relay 1H676 prohibits operation of rapid closing and normal closing of air conditioning valve which remains open. R
COND VALVE magnetic indicator displays continuity.
Position of relay 1H614 allows mass flow control valve solenoid to be supplied. The valve closes.
When AIR COND TEST switch H647 is placed in OFF position, relay 1H614 is again energized and test relay 1H676 is again de-energized.

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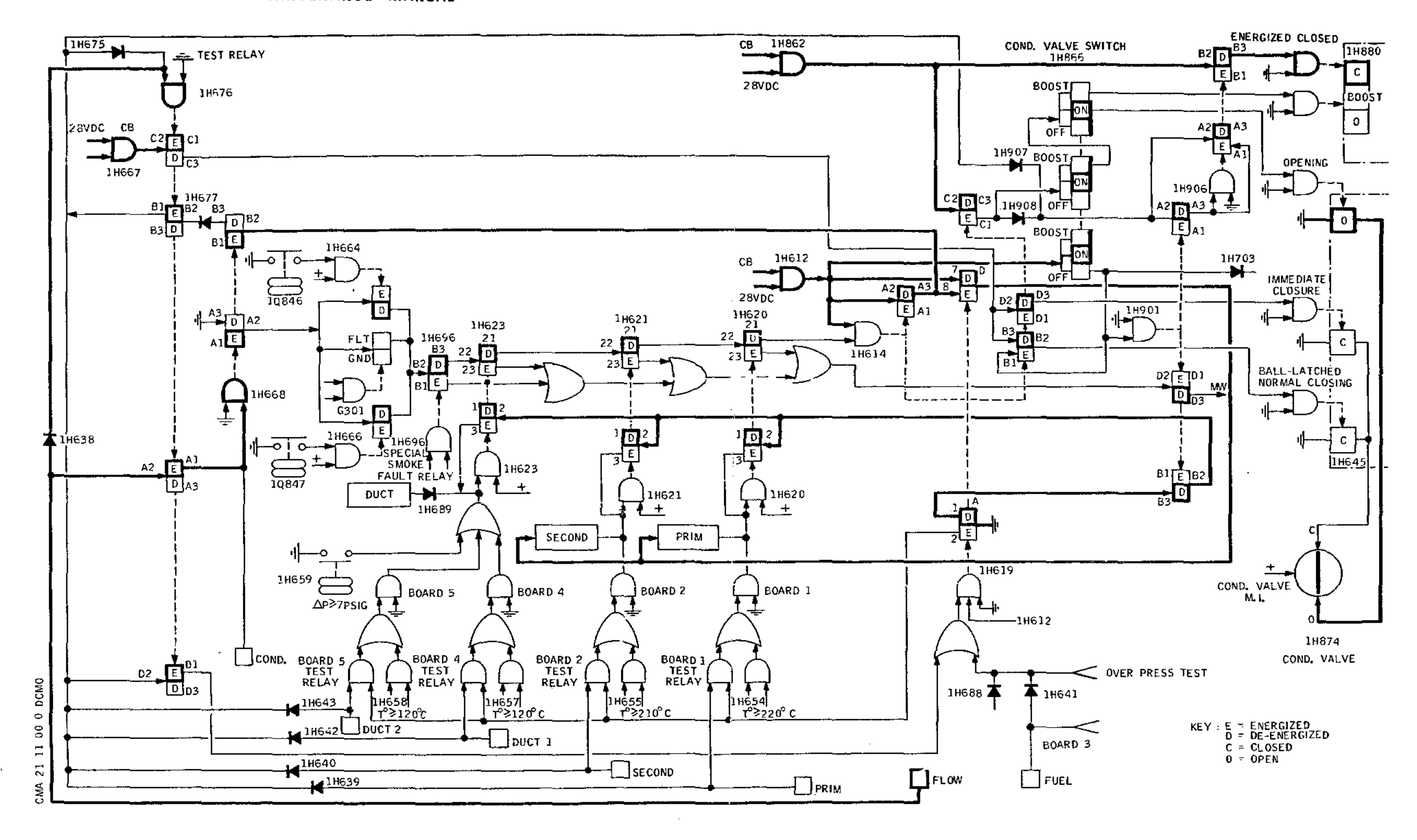


Air Conditioning Valve and Mass Flow Control
Valve - Test
Figure 037

The mass flow control valve solenoid is no longer energized. The valve opens. Both valves are open.

(7) At the end of the functional test of air conditioning valve and mass flow control valve, place overheat safety test selector in OFF position.

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Air Conditioning Valve and Mass Flow Control
Valve - Test
Figure 038

PRESSURE AND FLOW LIMITING - TROUBLE SHOOTING

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS IN 24-00-00, SERVICING.

1. General

The following information is intended to enable faults in flight or on the ground to be quickly rectified.
This information is given in the form of fault analysis synoptic charts.
The electrical wiring is assumed to be serviceable. However, if the fault is not detected check the wiring in accordance with Wiring Diagram Manual 21-11-01, 02, 03, 04, 05, 06, 07, 08. As the 4 groups making up the air conditioning system are identical trouble shooting is carried out on group 1. The description, indication and location of corresponding items in group 2, 3 and 4 are given in the component identification table (Ref. Table 101).
Trouble shooting is carried out with aircraft on ground, shock absorbers compressed.
The pressure reducing and shut off system cannot be tested completely with aircraft on ground, engines shut down. Only symptom analysis carried out on the ground, with engines running, or in flight, is included in the trouble shooting procedure.
The faults are set out in order from air intake to delivery according to the direction of system air flow.
If required a ground air supply unit, as described in para. 2A, can be used for trouble shooting on the ground, to simulate operation of the various valves.
It must be understood, however, that with the ground air supply units currently in use it is not possible to simulate a correct air temperature, pressure or flow.

2. Prepare

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	-
Ground Air Supply Unit Relative minimum pressure : 2 bar (29 psi) Minimum air flow : 0.4 kg/sec (0.88 lbf/sec) Relative Maximum pressure : 4.5 bar (65.25 psi) Maximum air flow : 0.6 kg/sec (1.32 lbf/sec) The temperature must not exceed 300°C (540°F)	-
1 Multimeter	-

B. Prepare

(1) Check that circuit breakers are set (Ref. 21-10-00, para. 2)

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(3) Connect ground air supply unit, if required and energize the aircraft electrical network.
- For failure of dual pressure reducing and shut off valve, refer to 21-11-11, Adjustment/Test.

- For a failure downstream of dual pressure reducing shut off valve, refer to 21-11-14, Adjustment/Test.

3. Trouble Shooting

Dual pressure reducing shut off valve fails to open

- BLEED VALVE switch - OPEN
  BLEED VALVE magnetic indicator - SHUT
  Air pressure indicator - zero
  Press DUCT warning light (PTT)
  OVERPRESS warning light illuminates
  AIR warning light and gong do not operate
  Replace BLEED VALVE switch 1H613

- BLEED VALVE switch - OPEN
  BLEED VALVE magnetic indicator - SHUT
  Air pressure indicator - zero
  Press DUCT warning light (PTT)
  OVER PRESS warning light illuminates
  AIR warning light and gong operate
  Ref. Chart 101

- BLEED VALVE switch - OPEN
  BLEED VALVE indicator - striped
  Air pressure indicator - zero
  Press DUCT warning light (PTT)
  AIR warning light and gong do not operate
  Ref. Chart 102

```
***************************************
*Dual pressure reducing shut off      *
*valve fails to open                  *
***************************************--------------------------------
                        |              |COND VALVE switch - OFF        |
                        |              |BLEED VALVE switch - OPEN      |
                        |              |BLEED VALVE magnetic indica-   |
                        |              |tor - OPEN                     |
                        ---------------|Air pressure indicator -       |
                                       | zero                          |
                                       |        Ref. Chart 103         |
                                       --------------------------------

***************************************
*Overpressure at group start up       *
***************************************--------------------------------
                        |              |COND VALVE switch - OFF        |
                        |              |BLEED VALVE switch - OPEN      |
                        |              |OVER PRESS warning light -     |
                        |              |illuminated                    |
                        ---------------|AIR warning light -            |
                                       |illuminated                    |
                                       |Associated aural warning       |
                                       |sounds                         |
                                       |        Ref. Chart 104         |
                                       --------------------------------
```


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```
************************************
*Permanent OVER PRESS warning      *
*Impossible to use air bleed       *
************************************------------------------------
                      |             |BLEED VALVE switch - SHUT    |
                      --------------|OVER PRESS warning lights -  |
                                    |illuminated                  |
                                    |        Ref. Chart 105       |
                                    ------------------------------

************************************
*OVER PRESS warning                *
*Loss of air bleed                 *
************************************------------------------------
                      |             |COND VALVE switch - ON or    |
                      |             |BOOST                        |
                      --------------|BLEED VALVE switch-OPEN      |
                                    |OVER PRESS warning light -   |
                                    |illuminated                  |
                                    |AIR warning light -          |
                                    |illuminated                  |
                                    |        Ref. Chart 106       |
************************************------------------------------
*Closing of dual pressure reducing *------------------------------
*shut off valve without warning    *|COND VALVE switch - ON or    |
************************************|BOOST                        |
                      |             |BLEED VALVE switch - OPEN    |
                      |             |Air pressure                 |
                      --------------|indicator -              zero|
                      |             |CAU IN indicator - reading   |
                      |             |decreases                    |
                      |             |        Ref. Chart 107       |
                      |             ------------------------------
```

COND VALVE switch - ON or BOOST
BLEED VALVE switch - OPEN
BLEED VALVE magnetic indicator - OPEN
Air pressure indicator - zero
CAU IN indicator - reading decreases
Ref. Chart 103

```
*************************************
*Dual pressure reducing             *
*shut off valve fails to open       *
*after OVER PRESS warning           *
*************************************-----------------------------
                  |             |COND VALVE switch - ON or   |
                  |             |                    BOOST   |
                  |             |BLEED VALVE switch - OPEN   |
                  |             |BLEED VALVE magnetic indica-|
                  |-------------|tor - OPEN                  |
                  |             |AIR warning light -         |
                  |             |illuminated                 |
                  |             |No aural warning            |
                  |             |DUCT PTT test inoperative   |
                  |             |Replace relay 1H618         |
                  |             ------------------------------
                  |             ------------------------------
                  |             |The same symptoms occur, but|
                  |-------------|DUCT PTT test operative     |
                  |             |Change diode 1H692          |
                  |             ------------------------------
*************************************
*Faulty closing or incorrect position*
*indication of dual pressure reducing*
*shut off valve                     *
*************************************
                  |             ------------------------------
                  |             |BLEED VALVE switch - SHUT   |
                  |             |Air pressure                |
                  |             |          indicator - zero  |
                  |-------------|BLEED VALVE magnetic indica-|
                                |tor - Striped               |
                                |         Ref. Chart 108     |
                                ------------------------------

*************************************
*Faulty closing or incorrect position*
*indication of dual pressure reducing*
*shut off valve                     *
*************************************-----------------------------
                  |             |BLEED VALVE switch - SHUT   |
                  |             |Air pressure                |
                  |             |          indicator-normal  |
                  |-------------|BLEED VALVE magnetic        |
                                |indicator - striped         |
                                |                            |
                                |         Ref. Chart 109     |
                                ------------------------------
```

Incorrect pressure on air pressure indicator 1H891

COND VALVE switch - ON or BOOST
BLEED VALVE switch - SHUT
Air pressure indicator - incorrect
Ref. Chart 110

Master warning inoperative during OVER PRESS warning

BLEED VALVE switch - OPEN
BLEED VALVE magnetic indicator - Shut Air pressure indicator - zero
OVER PRESS warning light - illuminated
AIR warning light - extinguished
No aural warning
Ref. Chart 111

OVERPRESS warning light illuminated after PTT test
PRIM/SEC FUEL DUCT 1 DUCT 2 and SMOKE test ineffective
DUCT warning light remains illuminated after PTT test

BLEED VALVE switch - OPEN
OVER PRESS caption light (after PTT test) remains illuminated
AIR warning light - illuminated
GR1 overheat tests inoperative
Replace relay 1H619 [8]

R B ************************************
R B *Overpressure warning associated with*
R B *heat exchanger or duct overheat.   *
R B ************************************

R B If an overpressure warning is indicated at the same time as, or after, a heat exchanger or duct overheat, the duct pressure relief valve PN.7001A02 should be suspected of not relieving. Check relief valve operation to MM 21-11-12 PB. 500 before changing the reducing shut-off valve.

****
* OVER PRESS test is faulty   *
****

BLEED VALVE switch - OPEN PTT OVER PRESS warning light illuminates No master warning Ref. Chart 112

****
*Dual pressure reducing and shut off *
*valve unsteady   *
****

BLEED VALVE switch - OPEN BLEED VALVE magnetic indicator - OPEN Air pressure indicator pointer fluctuates MASS FLOW indicator pointer fluctuates Ref. Chart 113

****
*Non-opening of air conditioning   *
*valve (ground test)   *
****

CROSS BLEED switch - OPEN COND VALVE switch - ON COND VALVE magnetic indicator - SHUT MASS FLOW indicator - zero Warning lights : extinguished SMOKE warning lights - extinguished Main engine feed pump switch - ON Engine LOW PRESS warning light - extinguished Ref. Chart 114

COND VALVE switch - ON
COND VALVE magnetic indicator striped
MASS FLOW indicator - zero
Ref. Chart 115

Air conditioning valve fails to close by normal control switch and is closed by selecting COND on rotary test switch

COND VALVE switch - OFF
COND VALVE magnetic indicator - OPEN
MASS FLOW indicator - normal
Ref. Chart 116

Air conditioning valve does not close after warning
COND VALVE switch - OFF
COND VALVE - closes

COND VALVE switch - ON or BOOST
PRIM SEC DUCT SMOKE warning lights - illuminated
AIR warning light - illuminated
MASS FLOW indicator - zero
COND VALVE magnetic indicator - OPEN
Ref. Chart 117

COND VALVE switch - ON or BOOST
PRIM SEC DUCT SMOKE warning lights - illuminated
AIR warning light - illuminated
MASS FLOW indicator- Normal
COND VALVE magnetic indicator - OPEN
Ref. Chart 118

Air conditioning valve subject to pressure surges

COND VALVE switch - ON
COND VALVE magnetic indicator moves from OPEN to striped, and back to OPEN.
MASS FLOW indicator pointer fluctuates
Ref. Chart 119

Air conditioning valve closes slowly after warning

COND VALVE switch - ON Or BOOST
PRIM SEC DUCT SMOKE warning lights - illuminated
AIR warning light - illuminated
Associated aural warning sounds
COND VALVE magnetic indicator (after 20 seconds) - SHUT
MASS FLOW indicator - zero
Ref. Chart 120

Air conditioning valve closing, incorrect indication

COND VALVE switch - OFF
MASS FLOW indicator - zero
COND VALVE magnetic indicator - striped
Ref. Chart 121

Air conditioning valve opening, incorrect indication (GR1 or GR2)

COND VALVE switch - ON or BOOST
MASS FLOW indicator - normal
COND VALVE magnetic indicator - striped
Ref. Chart 122

```
**************************************
*Air conditioning valve opening,     *
*incorrect indicator (GR3 pr GR4)    *
**************************************----------------------------
                         |              |COND VALVE switch - ON or   |
                         |              |BOOST                       |
                         |              |MASS FLOW indicator- normal|
                         ---------------|CAU IN indicator = normal   |
                                        |COND VALVE magnetic indica-|
                                        |tor - striped               |
                                        |        Ref. Chart 123      |
**************************************----------------------------
*Boost function defective on         *
*ground                              *
**************************************----------------------------
                         |              |During ground test,         |
                         |              |COND VALVE switch - BOOST   |
                         ---------------|MASS FLOW indicator reading|
                                        |does not increase.          |
                                        |        Ref. Chart 124      |
**************************************----------------------------
*Boost function defective during     *
*flight                              *
**************************************
                         |              ----------------------------
                         |              |In flight                   |
                         |              |COND VALVE switch - BOOST   |
                         ---------------|MASS FLOW indicator reading|
                                        |does not increase           |
                                        |        Ref. Chart 125      |
**************************************----------------------------
*MASS FLOW indicator pointer remains *
*at zero                             *
**************************************----------------------------
                         |              |COND VALVE switch - ON or   |
                         |              |BOOST                       |
                         ---------------|MASS FLOW indicator - low   |
                                        |stop "0" position           |
                                        |        Ref. Chart 126      |
                                        ----------------------------
```


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```
************************************
*MASS FLOW indicator pointer at    *
*maximum stop                      *
************************************-----------------------------
                      |             |COND VALVE switch - ON, OFF|
                      |             |on BOOST                   |
                      --------------|MASS FLOW indicator -      |
                                    |maximum stop               |
                                    |        Ref. Chart 127     |
************************************-----------------------------
*MASS FLOW indicator pointer at Z  *
*stop                              *
************************************-----------------------------
                      |             |COND VALVE switch - ON, OFF|
                      |             |or BOOST                   |
                      --------------|MASS FLOW indicator- Z stop|
                                    |- ground temperatures are  |
                                    |correct                    |
                                    |        Ref. Chart 128     |
                                    -----------------------------
```

```
*************************************---------------------------------
*BLEED VALVE SWITCH - OPEN          *| GROUND EQUIPMENT REQUIRED     |
*BLEED VALVE MAGNETIC INDICATOR -   *---------------------------------
*SHUT                               *| DESCRIPTION          PART NO. |
*AIR PRESSURE INDICATOR - ZERO      *---------------------------------
*************************************| 1 MULTIMETER                  |
                                     ---------------------------------

*************************************
*Disconnect connector 1H646A        *
*Check 28V between terminals        *
*A and B                            *
*************************************
      |                |
      |                |
      0V               28V
      |                |                ------------------------------
      |                |               | Replace dual pressure        |
      |                |---------------| reducing shut off            |
      |                                | valve [14]                   |
      |                                 ------------------------------
*************************************
*Check 28V between terminal A       *
*and chassis                        *
*************************************
      |                |
      0V               28V
      |                |                ------------------------------
      |                |---------------| Check wiring                 |
      |                                 ------------------------------
      |
      |
      |
      |
      |                                 ------------------------------
      |--------------------------------| Replace relay 1H618 [7]      |
                                        ------------------------------
```

Chart 101 (sheet 1 of 1)

```
***********************************
*BLEED VALVE SWITCH - OPEN        *
*BLEED VALVE MAGNETIC INDICATOR - *
*STRIPED                          *
*AIR PRESSURE INDICATOR ZERO      *
***********************************-------------------------------
                       |           |De-energize the aircraft     |
                       |           |electrical network           |
                       -------------|Replace circuit breaker 1H611|
                                   |     Ref. 24-50-00, R/I      |
                                   -------------------------------
```

Chart 102 (sheet 1 of 1)

```
*************************************------------------------------
*COND VALVE SWITCH - OFF            *| GROUND EQUIPMENT REQUIRED |
*BLEED VALVE MAGNETIC INDICATOR -   *------------------------------
*OPEN BLEED VALVE SWITCH - OPEN     *| DESCRIPTION       PART NO.|
*AIR PRESSURE INDICATOR - ZERO      *-----------------------------|
*************************************| 1 MULTIMETER              |
                                     ------------------------------

*************************************
*BLEED VALVE switch - OPEN          *
*Check voltage between terminals K  *
*and B on connector 1H646A          *
*************************************
      |                |
      |                |
      0V               28V       --------------------------------
      |                |         |Replace dual pressure reducing|
      |                |---------|and shut off valve 1H646      |
      |                          |     Ref. 21-11-11, R/I       |
      |                          --------------------------------
*************************************
*Check voltage between terminal     *
*K and ground                       *
*************************************
      |                |
      |                |
    0 Volt          28 Volts=========| Check wiring              |
      |                               -----------------------------
      |
      |                               -----------------------------
      |-------------------------------|Replace relay 1H661 [17]   |
                                      -----------------------------
```

Chart 103 (sheet 1 of 1)

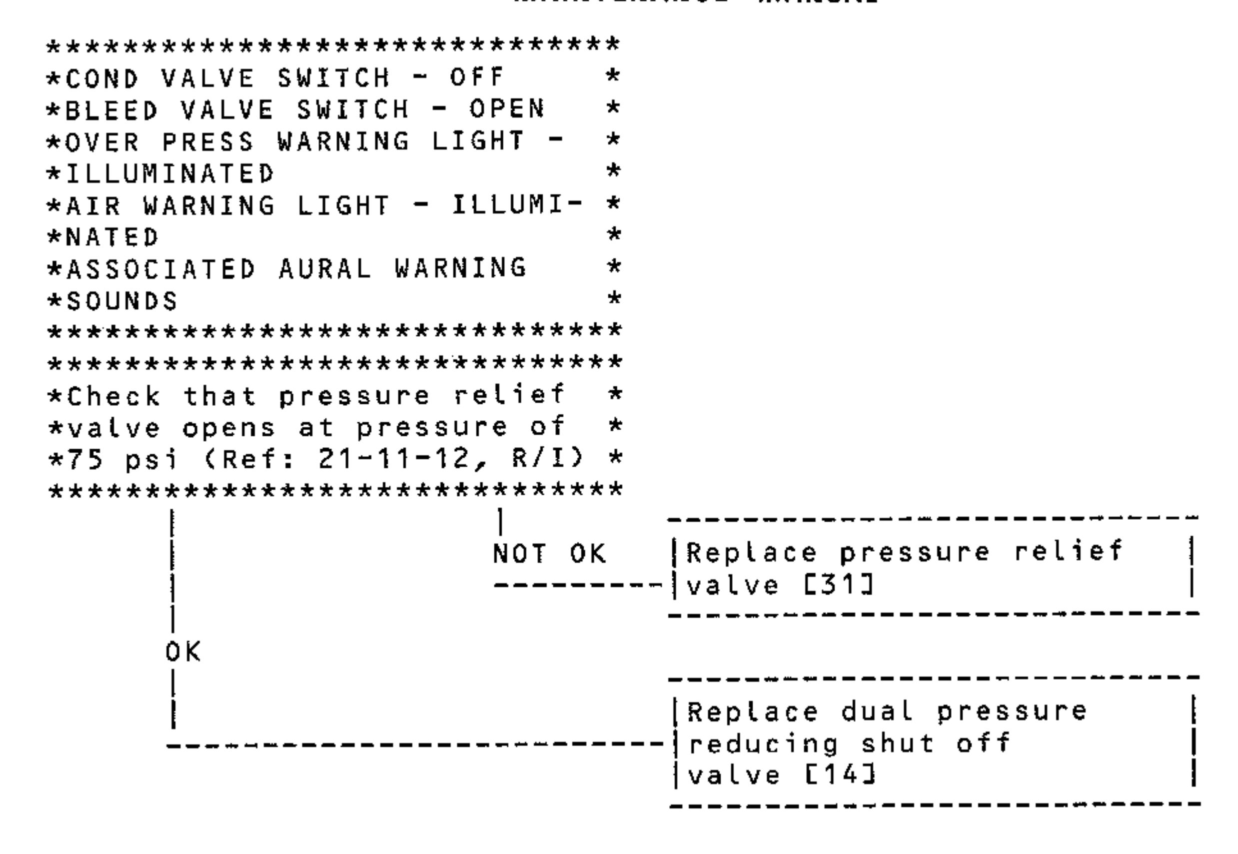


Chart 104 (sheet 1 of 4)

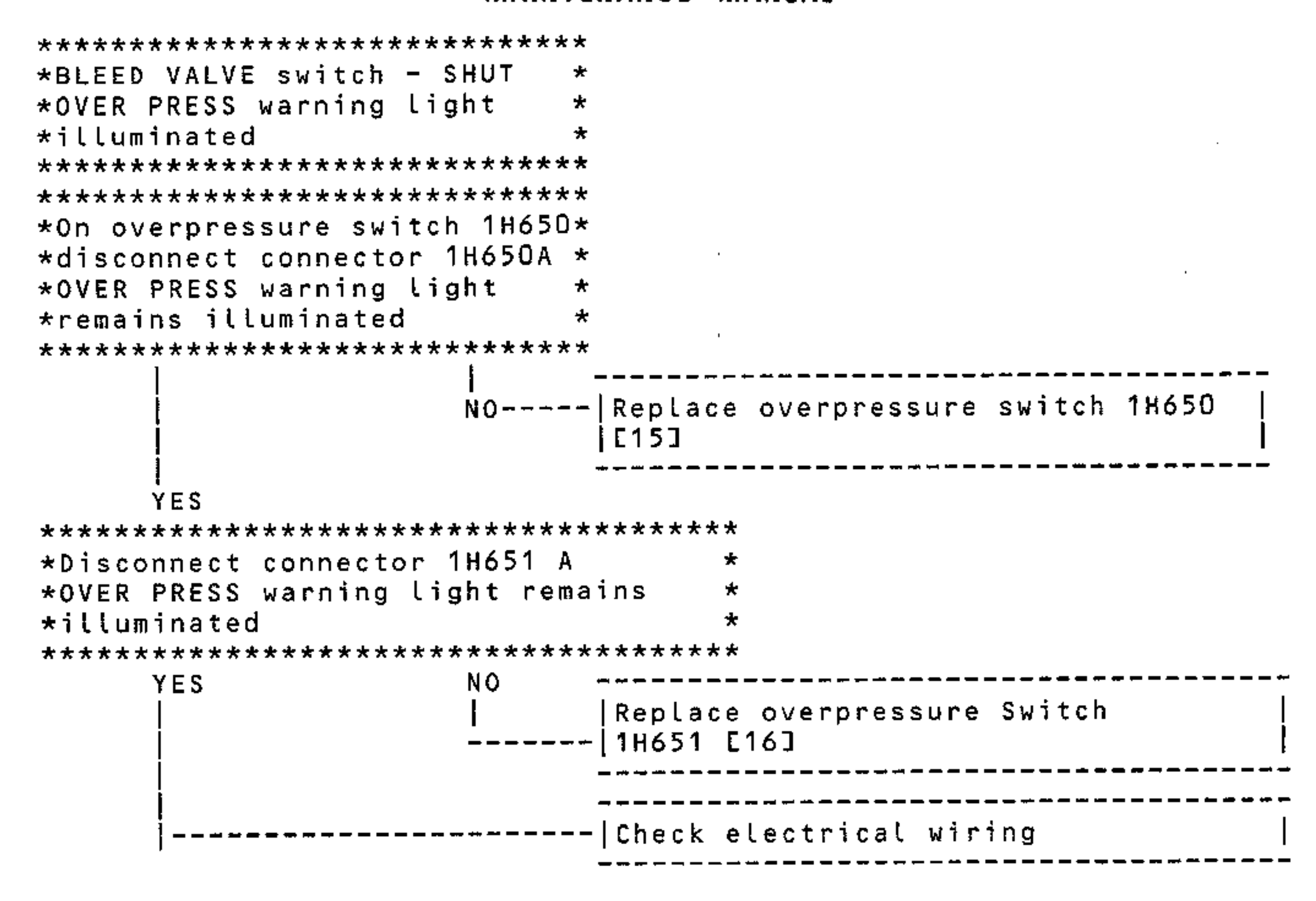


Chart 105 (sheet 1 of 1)

```
**************************************------------------------------
*COND VALVE SWITCH - ON OR BOOST     *| GROUND EQUIPMENT REQUIRED  |
*BLEED VALVE SWITCH - OPEN           *------------------------------
*OVER PRESS WARNING LIGHT -          *| DESCRIPTION       PART NO. |
*illuminated                         *------------------------------
*AIR WARNING LIGHT - ILLUMINATED     *|     Ref. 21-11-16, A/T     |
**************************************------------------------------
**************************************
*After BLEED VALVE closing and       *
*CROSS BLEED opening -               *
*OVER PRESS warning light illuminates*
**************************************
        |             |               ------------------------------
        |             NO              |Replace dual pressure       |
        YES           ----------------|reducing shut off valve     |
        |                             |[14]                        |
        |                             ------------------------------
**************************************
*Check overpressure switch 1H651     *
*operating pressure                  *
*      Ref: 21-11-16, A/T            *
**************************************------------------------------
        |             NOT OK          |Replace overpressure switch |
        OK            ----------------|1H651 [16]                  |
        |                             ------------------------------
        |                             ------------------------------
        |                             |Replace overpressure switch |
        ------------------------------|1H 650 [15]                 |
                                      ------------------------------
```

Chart 106 (sheet 1 of 1)

```
************************************
*COND VALVE SWITCH - ON OR BOOST   *
*BLEED VALVE SWITCH - OPEN         *
*BLEED VALVE MAGNETIC INDICATOR    *
*SHUT                              *
*AIR PRESSURE INDICATOR - ZERO CAU *
*IN INDICATOR - REDUCED READING    *
************************************-----------------------------
                                    |Replace dual pressure      |
                                    |reducing shut off valve    |
                                    |1H646 [14]                 |
                                    -----------------------------
```

Chart 107 (sheet 1 of 1)

```
*************************************
*BLEED VALVE SWITCH - SHUT          *
*AIR PRESSURE INDICATOR - ZERO      *
*BLEED VALVE MAGNETIC INDICATOR -   *
*STRIPED                            *
*************************************

*************************************
*On connector 1H646A interconnect   *
*terminals, F-H and C-D, on aircraft *
*network side                       *
*BLEED VALVE magnetic indicator     *
*displays SHUT                      *
*************************************------------------------------
        |             NO            |Replace BLEED VALVE          |
        |             --------------|magnetic indicator 1H644     |
        |                           |[12]                         |
       YES                          ------------------------------
        |                           ------------------------------
        |                           |Replace dual pressure        |
        |                           |reducing shut off valve      |
        ----------------------------|1H646 [14]                   |
                                    ------------------------------
```

Chart 108 (sheet 1 of 1)

Printed in England

```
**************************************
*BLEED VALVE SWITCH - OPEN           *
*AIR PRESSURE INDICATOR - NORMAL     *
*BLEED VALVE MAGNETIC INDICATOR      *
*STRIPED                             *
**************************************
**************************************
*On removable connector 1H646A, inter*
*connect terminals E and D           *
*BLEED VALVE magnetic indicator      *
*displays OPEN                       *
**************************************------------------------------
        |              |              |Replace BLEED VALVE magnetic|
        YES            NO-------------|indicator [12]              |
        |                              ------------------------------
        |                              ------------------------------
        |                             |Replace dual pressure       |
        ------------------------------|reducing shutoff valve 1H646|
                                      |1H646 [14]                  |
                                       ------------------------------
```

Chart 109 (sheet 1 of 1)

```
*************************************
*COND VALVE switch - ON or BOOST    *
*BLEED VALVE switch - OPEN          *
*Air pressure indicator -           *
*incorrect                          *
*************************************
*************************************
*With electrical ground power unit  *
*connected open the 2 adjacent cross-*
*bleed valves and compare readings  *
*on indicator. Readings differ      *
*************************************-----------------------------
       |              |             |Replace dual pressure        |
      YES             NO            |reducing shut off valve      |
       |              --------------|1H646 [14]                   |
*************************************-----------------------------
*Disconnect electrical ground power *
*unit. Shut cross bleed valves.     *
*Connect air bottle fitted with     *
*pressure gauge to pressure         *
*transmitter 1H892. Set a pressure of*
*60 psi and note the value on air   *
*pressure indicator 1H891           *
*      Ref: 21-11-17, A/T           *
*Interchange connectors on indicators*
*1H891 and 1H892                    *
*Their readings differ              *
*************************************-----------------------------
       |              |             |Replace air pressure         |
       |              NO            |transmitter 1H892 [29]       |
      YES                           -------------------------------
       |                            -------------------------------
       |                            |Replace air pressure         |
       -----------------------------|indicator 1H891 [28]         |
                                    -------------------------------
```

Chart 110 (sheet 1 of 1)

```
*************************************
*BLEED VALVE SWITCH - OPEN          *
*AIR PRESSURE INDICATOR - ZERO      *
*OVER PRESS WARNING LIGHT - ILLUMINA-*
*TED NO AURAL WARNING. AIR WARNING  *
*LIGHT                              *
*MAGNETIC - SHUT                    *
*************************************
*************************************
*With circuit breaker M242 set,     *
*On master warning panel test connec-*
*tor 272A, apply 28V to terminal 80 *
*The test is :                      *
*************************************-------------------------------
        |                            |Replace master warning        |
        OK            NOT OK---------|panel                         |
        |                            |     Ref. 31-00-00            |
        |                             -------------------------------
*************************************
*Perform DUCT PTT test              *
*Test is :                          *
*************************************
        |              |              ----------------------------
        |              NOT OK        |Replace relay 1H618 [7]    |
        |              ---------------------------------------------
        OK
        |                             ----------------------------
        -----------------------------|Replace relay 1K232 [30]   |
                                      ----------------------------
```

	GR1	GR2	GR3	GR4
Test connector on M.W. panel 7-216	272A	173A	274A	275A
Terminals	80	72	70	71

Chart 111 (sheet 1 of 1)

```
***************************************--------------------------------
* BLEED VALVE SWITCH OPEN              *| GROUND EQUIPMENT REQUIRED    |
* O/PRESS WARNING LIGHT PRESSED        *|------------------------------|
* AND ILLUMINATED                      *| DESCRIPTION        PART NO.  |
*MASTER WARNING INOPERATIVE            *|------------------------------|
****************************************| MULTIMETER                   |
                                        --------------------------------

*****************************************************
* In zone 123, on unit 7.123, ground terminal 9B of *
* test connector UT 1891                            *
* master warning inoperative                        *
*****************************************************
    ||                  |              ------------------------------
    YES                 |--NO----------| Replace diode 1H692 [19]    |
    ||                                 ------------------------------
*****************************************************
* Measure the voltage between the ground and        *
* terminal 9A of connector UT 1891                  *
*****************************************************
    ||                  |              ------------------------------
    28V                 |--0V----------| Replace BLEED VALVE switch |
    ||                                 | 1H613 [5]                  |
    ||                                 ------------------------------
*****************************************************
* Replace relay 1H618 [7]                           *
* At flight engineer's station, on AIR BLEED CONTROL*
* panel press OVER PRESS warning light              *
* AIR warning light illuminates                     *
*****************************************************
    ||   |     --------------------------------------------
    ||   |     | Press OVER PRESS warning light           |
    ||   |     | In zone 216, on panel 7-216, in unit W272,|
    YES  |-NO-| measure the voltage between terminal 30 and the|
    ||         | ground.                                  |
    ||         --------------------------------------------
    ||                 ||       |      ------------------------------
    ||                 28V      |--0V-----| Replace relay 1K232 [30]   |
    ||                 ||                 ------------------------------
    ||                 ||                 ------------------------------
    ||                 ||-----------------| Ref. 33-15-02              |
    ||                                    ------------------------------
    ||                                    ------------------------------
    ||------------------------------------| Relay 1H618 was faulty     |
                                          ------------------------------
```

Chart 112 (sheet 1 of 2)

	UNIT	CONNECTOR	TERMINAL
GR1	7-123	UT 1891	9B
GR2	7-123	UT 1893	9B
GR3	6-123	UT 1890	9B
GR4	8-123	UT 1892	9B
GR1	7-123	UT 1891	9A
GR2	7-123	UT 1893	9A
GR3	6-123	UT 1890	9A
GR4	8-123	UT 1892	9A

	SHELF	CONNECTOR	TERMINAL
GR1	7-216	W 272	80
GR2	7-216	W 273	72
GR3	7-216	W 274	70
GR4	7-216	W 274	71

Chart 112 (sheet 2 of 2)

```
*************************************
*BLEED VALVE SWITCH - OPEN          *
*BLEED VALVE MAGNETIC INDICATOR -   *
*OPEN                               *
*AIR PRESSURE INDICATOR POINTER -   *
*FLUCTUATES                         *
*MASS FLOW INDICATOR POINTER -      *
*FLUCTUATES                         *
*************************************-----------------------------
                              |              |Replace dual pressure        |
                              ---------------|reducing shut off valve      |
                                             | 1H646 [14]                  |
                                             -----------------------------
```

Chart 113 (sheet 1 of 1)

```
**************************************-----------------------------
*CROSS BLEED SWITCH - OPEN           *| GROUND EQUIPMENT REQUIRED |
*BLEED VALVE SWITCH - ON             *-----------------------------
*COND VALVE MAGNETIC INDICATOR -     *| DESCRIPTION      PART NO. |
*STRIPED                             *-----------------------------
*MASS FLOW INDICATOR - ZERO WARNING  *| 1 MULTIMETER              |
*LIGHTS - EXTINGUISHED SMOKE WARNING *-----------------------------
*LIGHT - EXTINGUISHED ENGINE FEED    *
*PUMP SWITCH - ON                    *
*ENGINE LOW PRESS WARNING LIGHT -    *
*EXTINGUISHED                        *
**************************************
**************************************
*Ground HP air supply unit connected *
*trip circuit breaker G292           *
*CROSS BLEED switch - OPEN           *
*Pressure must increase on pressure  *
*indicator                           *
*COND VALVE switch - ON              *
*Air conditioning valve fails to open*
**************************************-----------------------------
        |              |              |Check and if necessary     |
        |              NO             |replace diode 1H631 [32] and|
        YES            ---------------|relays 1H664 [33] and 1H666 |
                                      | [34]                      |
        |                             -----------------------------
**************************************
*Disconnect COND VALVE connector     *
*1H645A                              *
*Check 28V between terminals A and B *
**************************************-----------------------------
        |              |              |Replace air conditioning   |
        |              28V------------|valve 1H645 [13]           |
        0V                            -----------------------------
        |
**************************************
*Measure voltage between             *
*terminal A and ground               *
**************************************
        |              |              -----------------------------
        0V             28V------------|Check wiring               |
        |                             -----------------------------
**************************************
*On COND VALVE switch 1H866          *
*connect voltmeter between           *
*terminal 8 and aircraft ground      *
**************************************
        |              |              -----------------------------
        0V             28V------------|Change COND VALVE          |
        |                             |switch 1H866 [22]          |
        |                             -----------------------------
```

Chart 114 (sheet 1 of 2)

```
*************************************
*ON TEST CONNECTOR UT 1811 CONNECT  *
*TERMINAL 3C TO AIRCRAFT GROUND. NOTE*
*READING ON VOLTMETER PREVIOUSLY    *
*CONNECTED TO COND VALVE SWITCH     *
*************************************-----------------------------
        |              |              |Change relay 1H614 [6]     |
        |              0V------------------------------------------
       28V
        |
*************************************
*Remove ground from test connector  *
*UT 1811 and disconnect voltmeter   *
*************************************-----------------------------
        |                             |Check, and replace if      |
        ------------------------------|necessary, relays 1H620, [9]|
                                      |1H621 [10], 1H623 [11] and |
                                      |1H696 [12]                 |
                                      -----------------------------
```

GROUP	ELEC IDENT	ZONE	ACCESS
GR1	UT1811	123	14-123
GR2	UT1809	123	14-123
GR3	UT1812	123	17-123
GR4	UT1810	123	17-123

Chart 114 (sheet 2 of 2)

```
*******************************
*COND VALVE switch - OPEN     *
*COND VALVE magnetic indicator -*
*Striped MASS FLOW indicator -  *
*zero                           *
*******************************----------------------------------
                  |          |Replace circuit breaker 1H862   |
                  -----------| [21]                           |
                              ----------------------------------
```

Chart 115 (sheet 1 of 1)

```
*************************************----------------------------
*COND VALVE SWITCH - OFF            *| GROUND EQUIPMENT REQUIRED |
*COND VALVE MAGNETIC INDICATOR - OPEN*----------------------------
*MASS FLOW INDICATOR - NORMAL       *| DESCRIPTION      PART NO. |
*************************************----------------------------
                                     | 1 MULTIMETER              |
                                     ----------------------------

*************************************
*Trip circuit breaker G292          *
*COND VALVE switch - OFF            *
*Check 28V between terminals C and D *
*On COND VALVE connector 1H645A     *
*************************************----------------------------
           |            |            |Replace air conditioning   |
           0V           28V-------   |Valve 1H645 [13]           |
                                     ----------------------------
           |
           |
*************************************
* Check 28V between C and ground    *
*************************************
           |            |            ----------------------------
           0V           28V-------   | Check wiring              |
           |                         ----------------------------
*************************************
* On COND VALVE switch 1H866, in    *
* OFF position, check voltage       *
* between terminal 3 and            *
* aircraft ground                   *
*************************************----------------------------
           0V           28V-------   | Replace relay 1H614 [6]   |
           |                         ----------------------------
           |                         ----------------------------
           |-------------------------| Replace COND VALVE switch |
                                     | 1H866 [22]                |
                                     ----------------------------
```

Chart 116 (sheet 1 of 1)

```
*************************************-------------------------------
*COND VALVE SWITCH - ON OR BOOST     *| GROUND EQUIPMENT REQUIRED  |
*WARNING LIGHTS PRIM.SEC.DUCT.SMOKE- *-------------------------------
*ILLUMINATED                         *| DESCRIPTION       PART NO. |
*AIR WARNING LIGHT - ILLUMINATED     *-------------------------------
*MASS FLOW INDICATOR - ZERO          *| 1 MULTIMETER               |
*COND VALVE MAGNETIC INDICATOR -     *-------------------------------
*OPEN                                *
**************************************
**************************************
*Trip circuit breaker G292           *
*COND VALVE switch - ON              *
*Rotary test switch - COND           *
*AIR COND TEST switch - TEST         *
*On connector 1H645A check, aircraft *
*network side, voltage between       *
*terminals C and D, and E and F      *
**************************************
        |             |             -----------------------------
        OV            28V           |Replace air conditioning   |
        |             --------------|valve 1H645 [15]           |
*************************************-----------------------------
*Check output voltage on circuit     *
*breaker 1H667                       *
*************************************-----------------------------
        |             28V           |Replace relay 1H676 [35]   |
        |             -------------------------------------------
        OV
        |                           -----------------------------
        |                           |Replace circuit breaker    |
        ----------------------------|1H667/8 [36]               |
                                    -----------------------------
```

Chart 117 (sheet 1 of 1)

```
*************************************
*COND VALVE SWITCH - ON OR BOOST    *
*WARNING LIGHTS PRIM.SEC.DUCT.SMOKE -*
*ILLUMINATED                        *
*AIR WARNING LIGHT - ILLUMINATED    *
*MASS FLOW INDICATOR - NORMAL       *
*COND VALVE MAGNETIC INDICATOR -    *
*OPEN                               *
*************************************------------------------------
                          |-------------|Replace diode 1H907 [36]  |
                                        ------------------------------
```

GROUP	DIODE	UNIT
GR1	1H907	14-123
GR2	2H907	14-123
GR3	3H907	17-123
GR4	4H907	17-123

Chart 118 (sheet 1 of 1)

```
*************************************
*COND VALVE SWITCH - ON             *
*COND VALVE MAGNETIC INDICATOR MOVES *
*IN TURN FROM OPEN TO STRIPED AND   *
*BACK TO OPEN                       *
*MASS FLOW INDICATOR POINTER FLUCTU- *
*ATES                               *
*************************************------------------------------
                          |             |Replace air conditioning    |
                          --------------|valve 1H645 [15]            |
                                        ------------------------------
```

Chart 119 (sheet 1 of 1)

```
*************************************--------------------------------
*COND VALVE SWITCH - ON OR BOOST     *| GROUND EQUIPMENT REQUIRED   |
*WARNING LIGHTS PRIM,SEC,DUCT,SMOKE  *------------------------------
*ILLUMINATED                         *| DESCRIPTION      PART NO.   |
*AIR WARNING LIGHT - ILLUMINATED     *------------------------------
*ASSOCIATED AURAL WARNING SOUNDS     *| 1 MULTIMETER                |
*COND VALVE MAGNETIC INDICATOR       *------------------------------
*(AFTER 20 SEC.) - SHUT              *
*MASS FLOW INDICATOR - ZERO          *
*************************************
*************************************
*Check that LP fuel indicators are   *
*illuminated                         *
*Disconnect connector 1H645A and     *
*check 28V between terminals E and F *
*************************************--------------------------------
       |              OV             |Replace relay 1H614 [6]       |
       |              -----------------------------------------------
      28V
       |                             -------------------------------
       |                             |Replace air conditioning      |
       ------------------------------|valve [15]                    |
                                     -------------------------------
```

Chart 120 (sheet 1 of 1)

```
*******************************
*COND VALVE SWITCH - OFF      *
*MASS FLOW INDICATOR - ZERO   *
*COND VALVE MAGNETIC INDICATOR -*
*STRIPED                      *
*******************************
*******************************
*Disconnect COND VALVE connector*
*1H645A.Interconnect terminals *
*H and J                       *
*COND VALVE magnetic indicator *
*displays :                    *
*******************************
        |              |
        |              |         ----------------------------------
    STRIPED          SHUT        |Replace air conditioning valve  |
        |              |         |1H645 [15]                      |
        |                        ----------------------------------
        |                        ----------------------------------
        |                        |Replace magnetic indicator      |
        -------------------------|1H874 [25]                      |
                                 ----------------------------------
```

Chart 121 (sheet 1 of 1)

```
*********************************
*COND VALVE SWITCH - ON or BOOST*
*CAU IN INDICATOR - NORMAL      *
*MASS FLOW INDICATOR - NORMAL   *
*COND VALVE MAGNETIC INDICATOR -*
*STRIPED                        *
*********************************
*********************************
*Disconnect COND VALVE connector*
*1H645A. Interconnect terminals *
*J and K                        *
*COND VALVE magnetic indicator  *
*displays :                     *
*********************************-----------------------------------
        |              |          |Replace air conditioning valve   |
     STRIPED          OPEN        |1H645 [15]                       |
        |                          -----------------------------------
        |                          -----------------------------------
        |                          |Replace magnetic indicator       |
        --------------------------|1H874 [25]                       |
                                   -----------------------------------
```

Chart 122 (sheet 1 of 1)

```
**************************************---------------------------------
*COND VALVE SWITCH - ON OR BOOST      *| GROUND EQUIPMENT REQUIRED   |
*MASS FLOW INDICATOR - NORMAL         *---------------------------------
*CAU IN INDICATOR - NORMAL            *| DESCRIPTION       PART NO   |
*COND VALVE MAGNETIC INDICATOR        *---------------------------------
*3 OR 4 - STRIPED                     *| 1 MULTIMETER                |
**************************************---------------------------------
**************************************
*Disconnect COND VALVE connector      *
*3H645A                               *
*Interconnect terminals J and K COND  *
*VALVE magnetic indicator displays :  *
**************************************---------------------------------
      |              |               |Replace air conditioning     |
   STRIPED         OPEN              |valve 3H645 [15]             |
      |                              ---------------------------------
**************************************
*Check diode 3H905                    *
**************************************---------------------------------
      OK              NOT OK         |Replace diode 3H905 [37]     |
      |               ---------------------------------------------
      |                              ---------------------------------
      |                              |Replace magnetic indicator   |
      --------------------------------|3H874 [25]                   |
                                     ---------------------------------
```

GROUP	DIODE	magnetic indicator	Air conditioning valve
GROUP 3	3H905	3H874	3H645
GROUP 4	4H905	4H874	4H645

Chart 123 (sheet 1 of 1)

```
************************************-------------------------------
*DURING GROUND TEST,               *| GROUND EQUIPMENT REQUIRED  |
*COND VALVE SWITCH - BOOST         *-------------------------------
*MASS FLOW INDICATOR READING DOES  *| DESCRIPTION        PART NO |
*NOT INCREASE                      *
************************************| 1 MULTIMETER               |
                                    -------------------------------

************************************
*On mass flow control valve,       *
*disconnect connector 14880A       *
*COND VALVE switch - BOOST         *
*Check 28V, on aircraft network side,*
*between terminals D and E         *
************************************-------------------------------
      |             |               |Replace mass flow control   |
      0V            28V-------------|valve 1H880 [26]            |
      |                             -------------------------------
      |
************************************
*Check 28V between D and ground    *
************************************-------------------------------
      0V            28V-------------|Check wiring                |
      |                             -------------------------------
      |
************************************
*On COND VALVE switch, check 28 V  *
*between terminal D and aircraft   *
*ground                            *
************************************-------------------------------
      |             28V             |Replace relay 1H871 [24]    |
      0V            -----------------------------------------------
************************************
*On COND VALVE switch, check 28V   *
*between terminal 8 and aircraft   *
*ground                            *
************************************-------------------------------
      |             |               |Replace COND VALVE switch   |
      |             28V-------------|1H866 [22]                  |
      0V                            -------------------------------
      |                             -------------------------------
      ------------------------------|Replace relay 1H614 [6]     |
                                    -------------------------------
```

Chart 124 (sheet 1 of 1)



```
*************************************
*AIRCRAFT IN FLIGHT                 *
*COND VALVE SWITCH - BOOST          *
*MASS FLOW INDICATOR READING DOES   *
*NOT INCREASE                       *
*************************************
*************************************
*BOOST operation, aircraft on ground *
*************************************-----------------------------
        |              |             |Replace C A U absolute     |
        NOT OK         OK------------|pressure switch 1H884 [27] |
        |                            -----------------------------
        |                            -----------------------------
        -----------------------------|Ref. to Chart 125 (sheet 1 |
                                     |of 1)                      |
                                     -----------------------------
```

Chart 125 (sheet 1 of 4)

```
*************************************-----------------------------
*COND VALVE SWITCH-ON OR BOOST      *| GROUND EQUIPMENT REQUIRED |
*MASS FLOW INDICATOR POINTER - LOW O *-----------------------------
*STOP POSITION.                     *| DESCRIPTION      PART NO. |
*GROUP TEMPERATURE CORRECT          *-----------------------------
*************************************| 1 MULTIMETER              |
                                     -----------------------------

*************************************
*With aircraft electrical network   *
*energized,                         *
*On master control unit test connec- *
*tor measure reading between termi-  *
*nals c and h                       *
*Voltage reading must be less than  *
*600 mV                             *
*************************************-----------------------------
        |              |             |Replace mass flow sensor   |
        YES            NO------------|1D62 [2]                   |
*************************************-----------------------------
*Interchange master control unit 1  *
*and 2 MASS FLOW 1 indicator pointer *
*moves to maximum position          *
*************************************-----------------------------
        |              |             |Replace mass flow sensor   |
        YES            NO------------|1D62 [2]                   |
        |                            -----------------------------
        |                            -----------------------------
        |                            |Replace Master Control     |
        -----------------------------|Unit 1H868 (MCU) [23]      |
                                     -----------------------------
```

Chart 126 (sheet 1 of 1)

```
*************************************-------------------------------
*COND VALVE switch - ON,OFF, or BOOST*| GROUND EQUIPMENT REQUIRED   |
*MASS FLOW indicator pointer - maxi- *-------------------------------
*mum stop position                   *| DESCRIPTION        PART NO. |
*************************************-------------------------------
                                      | 1 MULTIMETER                |
                                      -------------------------------

*************************************
*As the aircraft electrical network *
*is not energized, MASS FLOW indica- *
*tor pointer in Z position           *-------------------------------
*************************************|Replace MASS FLOW indicator |
       OK            NOT OK---------|1D61 [1]                    |
*************************************-------------------------------
*Remove master control unit 1H868. On*
*rack rear connector check that      *
*resistance between terminals:       *
*  19 and 20 is greater than 1Kohms  *
*  18 and 20 is greater than 13Kohms *
*************************************
       |              |              -------------------------------
       OK             NOT OK         |Replace mass flow sensor      |
       |              --------------|1D62 [2]                      |
       |                             -------------------------------
       |                             -------------------------------
       |                             |Replace Master Control        |
       -----------------------------|Unit 1H868 [23]               |
                                     -------------------------------
```

Chart 127 (sheet 1 of 1)

```
*************************************------------------------------
*COND VALVE SWITCH - ON,OFF, OR BOOST*| GROUND EQUIPMENT REQUIRED  |
*MASS FLOW INDICATOR POINTER - Z     *-----------------------------
*POSITION                            *| DESCRIPTION      PART NO.  |
*GROUP TEMPERATURES CORRECT          *|----------------------------|
*************************************| 1 MULTIMETER               |
                                      ------------------------------

*************************************
*With aircraft electrical network    *
*energized -                         *
*On master control unit test connec- *
*tor, measure voltage between termi- *
*nals F and H. Reading must be 68V ± *
*0,5V                                *
*************************************------------------------------
        |              OK            |Replace MASS FLOW indicator |
       NOT OK          --------------|1D61 [1]                    |
        |                             ------------------------------
*************************************
*Remove master control unit 1H868. On*
*rack rear connector check that      *
*resistance between terminals :      *
*  19 and 20 is greater than 1K Ohms *
*  18 and 20 is greater than 13K Ohms*
*************************************------------------------------
       NOT OK          OK------------|Replace master control unit |
        |                            | 1H868 [23]                 |
        |                             ------------------------------
        |                             ------------------------------
        -----------------------------|Replace mass flow sensor    |
                                     |1D62 [2]                    |
                                      ------------------------------
```

Chart 128 (sheet 1 of 1)

```
***************************************
* COND VALVE 1 SWITCH IN ON POSITION *
* MASS FLOW 1 INDICATOR - LOW -       *
***************************************

************************************************
* Air conditioning groups 1 and 2 operate      *
* GR1 and GR2 switches in OPEN position        *
* interchange GR1 and GR2 MASS FLOW indicators *
* GR1 air flow is lower than GR2 airflow       *
************************************************
     ||                            |
     ||                            |          -------------------------------
     ||                            |          | Replace MASS FLOW indicator|
     YES                           |--NO-----| 1D61 [1]                    |
     ||                                       -------------------------------
     ||
************************************************
* Interchange amplifiers 1H868 and 2H868. GR1  *
* airflow is lower than GR2 airflow.           *
************************************************
     ||                            |
     ||                            |          -------------------------------
     ||                            |          | Replace master control      |
     YES                           |--NO-----| unit 1H68 [23]              |
     ||                                       -------------------------------
     ||
************************************************
* Interchange wirings of sensors 1D62 and 2D62 *
* GR1 airflow is lower than GR2 airflow.       *
************************************************
     ||                            |
     ||                            |          -------------------------------
     YES                           |--NO-----| Replace mass flow           |
     ||                                       | sensor 1D62 [2]             |
     ||                                       -------------------------------
     ||
************************************************
* On mass flow control valve 1H880, disconnect *
* duct from pneumatic temperature sensor       *
* and blank off union on valve side            *
* Air flow is lower than GR2 airflow           *
************************************************
     ||                            |
     ||                            |
     ||                            |
     ||                            |
     ||                            |
     ||                            |
```

Chart 129 (sheet 1 of 2)

```
||                                 |
||                                 |
||                                 |      ---------------------------------
||                                 |      | Replace pneumatic             |
YES                                |--NO--| temperature sensor            |
||                                        | Ref. 21-11-15, R/I            |
||                                        ---------------------------------
||
||                                        ---------------------------------
||----------------------------------------| Replace mass flow control     |
                                          | valve 1H880 [26].             |
                                          ---------------------------------
```

Chart 129 (sheet 2 of 2)

```
**************************************
* COND VALVE 1 SWITCH IN ON POSITION *
* MASS FLOW 1 INDICATOR - HIGH-      *
**************************************

*****************************************************
* Air conditioning group 1 and 2 operate            *
* GR1 and GR2 CROSS BLEED switches in OPEN position *
* interchange GR1 and GR2 MASS FLOW indicators      *
* GR1 airflow is higher than GR2 airflow.           *
*****************************************************
    ||                        |
    ||                        |         ------------------------------
    ||                        |         | Replace MASS FLOW indicator|
    YES                       |--NO-----| 1D61 [1]                   |
    ||                                  ------------------------------
    ||
*****************************************************
* Interchange master control units 1H868 and 2H868  *
* GR1 airflow is higher than GR2 airflow.           *
*****************************************************
    ||                        |
    ||                        |         ------------------------------
    ||                        |         | Replace master control     |
    YES                       |--NO-----| unit 1H868 [23]            |
    ||                                  ------------------------------
    ||
*****************************************************
* Interchange wirings of sensors 1D62 and 2D62      *
* GR1 airflow is higher than GR2 airflow            *
*****************************************************
    ||                        |
    ||                        |         ------------------------------
    ||                        |         | Replace mass flow sensor   |
    YES                       |--NO-----| 1D62 [2]                   |
    ||                                  ------------------------------
    ||
    ||                                  ------------------------------
    ||                                  | Replace mass flow control  |
    ||----------------------------------| valve 1H880 [26]           |
                                        ------------------------------
```

Chart 130

4. Component Identification Table 101

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
[1] Indicator						
MASS FLOW GR1		2-214	1D 61		21-11-63 R/I	21-11-52
GR2		2-214	2D 61		21-11-63 R/I	21-11-62
GR3		2-214	3D 61		21-11-63 R/I	21-11-72
GR4		2-214	4D 61		21-11-63 R/I	21-11-82
[2] Sensor -						
Mass Flow GR1	151CB		1D 62	M17	21-11-41 R/I	21-11-52
GR2	151CB		2D 62	B 8	21-11-41 R/I	21-11-62
GR3	151CB		3D 62	B 9	21-11-41 R/I	21-11-82
GR4	151CB		4D 62	M18	21-11-41 R/I	21-11-82
[3] Circuit breaker LH UC						
WEIGHT SW "A" SUP GR1		1-213	G292	M17	24-50-00 R/I	
LH UC WEIGHT SW "B" SYS SUP GR4		3-213	G293	B 8	24-50-00 R/I	
RH UC WEIGHT SW B SYS SUP GR4		3-213	G294	B 9	24-50-00 R/I	
RH UC WEIGHT SW "A" SYS SUP GR4		1-213	G295	M18	24-50-00 R/I	
[4] Circuit breaker ENG1 B/						
VALVE CONT AND OVER PRESS IND		1-213	1H611	D10	24-50-00 R/I	21-11-11
ENG2 B/VALVE CONT AND OVER PRESS IND		5-213	2H611	A08	24-50-00 R/I	21-11-21
ENG3 B/VALVE CONT AND OVER					24-50-00	

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
PRESS IND		15-215	3H611	A04	R/I	21-11-31
ENG4 B/VALVE CONT AND OVER PRESS IND		15-216	4H611	A23	24-50-00 R/I	21-11-41
[5] Switch - BLEED VALVE						
GR1		2-214	1H613		21-10-00 R/I	21-11-11
GR2		2-214	2H613		21-10-00 R/I	21-11-21
GR3		2-214	3H613		21-10-00 R/I	21-11-31
GR4		2-214	4H613		21-10-00 R/I	21-11-41
[6] Relay - fault GR1		14-123	1H614		21-10-00 R/I	21-11-51
GR2		14-123	2H614		21-10-00 R/I	21-11-61
GR3		17-123	3H614		21-10-00 R/I	21-11-71
GR4		17-123	4h614		21-10-00 R/I	21-11-81
[7] Relay fault safety A						
GR1		7-213 AB	1H618		21-10-00 R/I	21-11-11
GR2		7-213 AB	2H618		21-10-00 R/I	21-11-21
GR3		8-213 AB	3H618		21-10-00 R/I	21-11-31
GR4		8-213 AB	4H618		21-10-00 R/I	21-11-41
[8] Relay - test GR1		14-123 BB	1H619		21-10-00 R/I	21-12-12
GR2		14-123 BB	2H619		21-10-00 R/I	21-12-22
GR3		17-123 BB	3H619		21-10-00 R/I	21-12-32

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
GR4		17-123 BB	4H619		21-10-00 R/I	21-12-42
[9] Relay GR1		14-123	1H620		21-10-00 R/I	21-12-12
GR2		14-123	2H620		21-10-00 R/I	21-12-22
GR3		17-123	3H620		21-10-00 R/I	21-12-32
GR4		17-123	4H620		21-10-00 R/I	21-12-42
[10] Relay GR1		14-123	1H621		21-10-00 R/I	21-12-12
GR2		14-123	2H621		21-10-00 R/I	21-12-22
GR3		17-123	3H621		21-10-00 R/I	21-12-32
GR4		17-123	4H621		21-10-00 R/I	21-12-42
[11] Relay GR1		14-123	1H623		21-10-00 R/I	21-12-12
GR2		14-123	2H623		21-10-00 R/I	21-12-22
GR3		17-123	3H623		21-10-00 R/I	21-12-32
GR4		17-123	4H623		21-10-00 R/I	21-12-42
[12] Magnetic indicator BLEED VALVE						
GR1		2-214	1H644		21-10-00 R/I	21-11-11
GR2		2-214	2H644		21-10-00 R/I	21-11-21
GR3		2-214	3H644		21-12-00 R/I	21-11-21
GR4		2-124	4H644		21-10-00 R/I	21-11-41

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[13] Valve - Air Conditioning GR1	415CL		1H645		21-11-13 R/I	21-11-51
GR2	426CR		2H645		21-11-13 R/I	21-11-61
GR3	435CL		3H645		21-11-13 R/I	21-11-71
GR4	446CR		4H645		21-11-13 R/I	21-11-81
[14] Valve - dual pressure reducing shut off valve GR1	415CL		1H646		21-11-11 R/I	21-11-11
GR2	426CR		2H646		21-11-11 R/I	21-11-21
GR3	435CL		3H646		21-11-11 R/I	21-11-31
GR4	446CR		4H646		21-11-11 R/I	21-11-41
[15] Switch - overpressure GR1	415AL		1H650		21-11-16 R/I	21-11-11
GR2	426AR		2H650		21-11-16 R/I	21-11-21
GR3	435AL		3H650		21-11-16 R/I	21-11-31
GR4	446AR		6H650		21-11-16 R/I	21-11-41
[16] Switch-O-verpressure GR1	415AL		1H651		21-11-16 R/I	21-11-11
GR2	426AR		2H651		21-11-16 R/I	21-11-21
GR3	453AL		3H651		21-11-16 R/I	21-11-31
GR4	446AR		4H651		21-11-16 R/I	21-11-41

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[17] Relay - time delay GR1		14-123	1H661		21-10-00 R/I	21-11-11
GR2		14-123	2H661		21-10-00 R/I	21-11-21
GR3		17-123	3H661		21-10-00 R/I	21-11-31
GR4		17-123	4H661		21-10-00 R/I	21-11-41
[18] Circuit breaker AIR COND VALVE EMER CLOSE SUP GR1		1-123	1H667	F13	24-50-00 R/I	21-11-51
GR2		5-213	2H667	A10	24-50-00 R/I	21-11-61
GR3		15-215	3H667	F02	24-50-00 R/I	21-11-71
GR4		15-216	4H667	F26	24-50-00 R/I	21-11-31
[19] Diode GR1		7-213 AB	1H692		21-10-00 R/I	21-11-11
GR2		7-123 AB	2H692		21-10-00 R/I	21-11-21
GR3		8-123 AB	3H692		21-10-00 R/I	21-11-31
GR4		8-123 AB	4H692		21-10-00 R/I	21-11-41
[20] Relay GR1		14-213	1H696			21-12-12
GR2		14-123	2H696			21-12-22
GR3		17-123	3H696			21-12-32
GR4		17-123	4H696			21-12-42
[21] Circuit breaker - GEN CONT AND IND GR1		1-213	1H862	D13	24-50-00 R/I	21-11-51
GR2		5-213	2H862	F09	24-50-00 R/I	21-11-61
GR3		15-215	3H862	B03	24-50-00 R/I	21-11-71

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
GR4		15-216	4H862	B23	24-50-00 R/I	21-11-81
[22] Switch - COND VALVE GR1		2-214	1H866		21-10-00 R/I	21-11-51
GR2		2-214	2H866		21-10-00 R/I	21-11-61
GR3		2-214	3H866		21-10-00 R/I	21-11-71
GR4		2-214	4H866		21-10-00 R/I	21-11-81
[23] Master control unit GR1		2-215	1H868		21-13-51 R/I	21-11-52
GR2		1-215	2H868		21-13-51 R/I	21-11-62
GR3		1-216	3H868		21-13-51 R/I	21-11-72
GR4		2-216	4H868		21-13-51 R/I	21-11-82
[24] Relay - Bootstrap control GR1		14-123 BB	1H871		21-10-00 R/I	21-11-51
GR2		14-123 BB	2H871		21-10-00 R/I	
GR3		17-123 BB	3H871		21-10-00 R/I	21-11-71
GR4		17-123 BB	4H871		21-10-00 R/I	21-11-81
[25] Magnetic indicator - COND VALVE GR1		2-214	1H874		21-10-00 R/I	21-11-51
GR2		2-214	2H874		21-10-00 R/I	21-11-61
GR3		2-214	3H874		21-10-00 R/I	21-11-61

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ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
GR4		2-214	4H874		21-10-00 R/I	21-11-81
[26] Valve - Mass flow control						
GR1	415CL		1H880		21-11-14 R/I	21-11-51
GR2	426CR		2H880		21-11-14 R/I	21-11-61
GR3	435CL		3H880		21-11-14 R/I	21-11-71
GR4	446CR		4H880		21-11-14 R/I	21-11-81
[27] Cold Air Unit pressure switch absolute						
GR1	415CL		1H884		21-12-16 R/I	21-12-51
GR2	426CR		2H884		21-12-16 R/I	21-12-61
GR3	435CL		3H884		21-12-16 R/I	21-12-71
GR4	446CR		4H884		21-12-16 R/I	21-12-81
[28] Indicator-pressure, air						
R GR1		2-214	1H891		21-11-62 R/I	21-11-11
R GR2		2-214	2H891		21-11-62 R/I	21-11-31
GR3		2-214	3H891		21-11-62 R/I	21-11-31
GR4		2-214	4H891		21-11-62 R/I	21-11-41

	ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
	[29] Transmit-ter - air duct pressure GR1	415AL		1H892		21-11-17 R/I	21-11-11
R	GR2		2-214	2H892		21-11-17 R/I	21-11-21
R	GR3		2-214	3H892		21-11-17 R/I	21-11-31
R	GR4		2-214	4H892		21-11-17 R/I	21-11-41
	[30]Relay fire control GR1		19-123 BB	1K232			21-11-11
	GR2		19-123 BB	2K232			21-11-21
	GR3		20-123 BB	3K232			21-11-31
	GR4		20-123 BB	4K232			21-11-41
	[31] Relief valve - pressure GR1	415CL				21-11-12 R/I	
	GR2	426CR				21-11-12 R/I	
	GR3	435CL				21-11-12 R/I	
	GR4	446CR				21-11-12 R/I	
	[32] Diode GR1		14-123	1H631		21-10-00 R/I	21-12-12
	GR2		14-123	2H631		21-10-00 R/I	21-12-22
	GR3		14-123	3H631		21-10-00 R/I	21-12-32
	GR4		17-123	4H631		21-10-00 R/I	21-12-42

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[33] Relay GR1		14-123	1H664		21-10-00 R/I	21-12-12
GR2		14-123	2H664		21-10-00 R/I	21-12-22
GR3		17-123	3H664		21-10-00 R/I	21-12-32
GR4		17-123	4H664		21-10-00 R/I	21-12-42
[34] Relay GR1		14-123	1H666		21-10-00 R/I	21-12-12
GR2		14-123	2H666		21-10-00 R/I	21-12-22
GR3		17-123	3H666		21-10-00 R/I	21-12-32
GR4		17-123	4H666		21-10-00 R/I	21-12-42
[35] Relay GR1		14-123	1H676		21-10-00 R/I	21-12-11
GR2		14-123	2H676		21-10-00 R/I	21-12-21
GR3		17-123	3H676		21-10-00 R/I	21-12-31
GR4		17-123	4H676		21-10-00 R/I	21-12-41
[36] Diode GR1		14-123	1H907		21-10-00 R/I	21-11-51
GR2		14-123	2H907		21-10-00 R/I	21-11-61
GR3		17-123	3H907		21-10-00 R/I	21-11-71
GR4		17-123	4H907		21-10-00 R/I	21-11-81
[37] Diode GR3		8-123	3H905		21-10-00 R/I	21-11-71
GR4		8-123	4H905		21-10-00 R/I	21-11-81

5. Close-Up

Shut down air conditioning groups, stop and disconnect ground air supply unit.

END OF THIS SECTION

NEXT

DUAL PRESSURE REDUCING SHUT-OFF VALVE - REMOVAL/INSTALLATION

1. General

The removal operation is identical for the four valves. These valves are located on RH side of engines 2 and 4 and on LH side of engines 1 and 3.

2. Dual Pressure Reducing Shut-Off Valve

A. Equipment and Materials

DESCRIPTION	PART NO.
Access platform 1.80 m (5 ft. 11 in.)	

B. Prepare

(1) Trip safety and tag the following circuit breaker

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1 ENG 1 B/VALVE CONT & OVER PRESS IND	1-213	1H 611	D10
Group 2 ENG 2 B/VALVE CONT & OVER PRESS IND	5-213	2H 611	A 8
Group 3 ENG 3 B/VALVE CONT & OVER PRESS IND	15-215	3H 611	A 4
Group 4 ENG 4 B/VALVE CONT & OVER PRESS IND	15-216	4H 611	A23

(2) Position access platform.

(3) On the nacelle, open access panels

415CL for removal of Group 1 valve
426CR for removal of Group 2 valve
435CL for removal of Group 3 valve

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446CR for removal of Group 4 valve.

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1).

(2) Disconnect unions (2) and (4).

(3) Remove screw (3), retain nut and washer.

(4) Remove pipe (5).

(5) Remove screws (8).

(6) Remove clamp (6).

(7) Remove valve (7).

D. Install

(1) Install valve (7) fitted with a new seal (9).

(2) Install seal (10), screws (8).

(3) Install clamp (6).

<u>CAUTION</u>: THE CLAMPS MUST BE INSTALLED WITH GREAT CARE. TORQUE TO 0.6m.daN (53.082 lbf in.). THE CLAMP ATTACHMENT MUST BE LOCATED ON SIDE OF DUCT
RB MARKED WITH AN ARROW. TORQUE LOAD FOR POST MOD
RB 21C100 AVICA CLAMPS IS 120 lbs/ins.

(4) Install pipe (5), tighten unions (2) and (4).

(5) Install screw (3) securing pipe (5) clamp; install washer and nut.

(6) Install electrical connector (1).

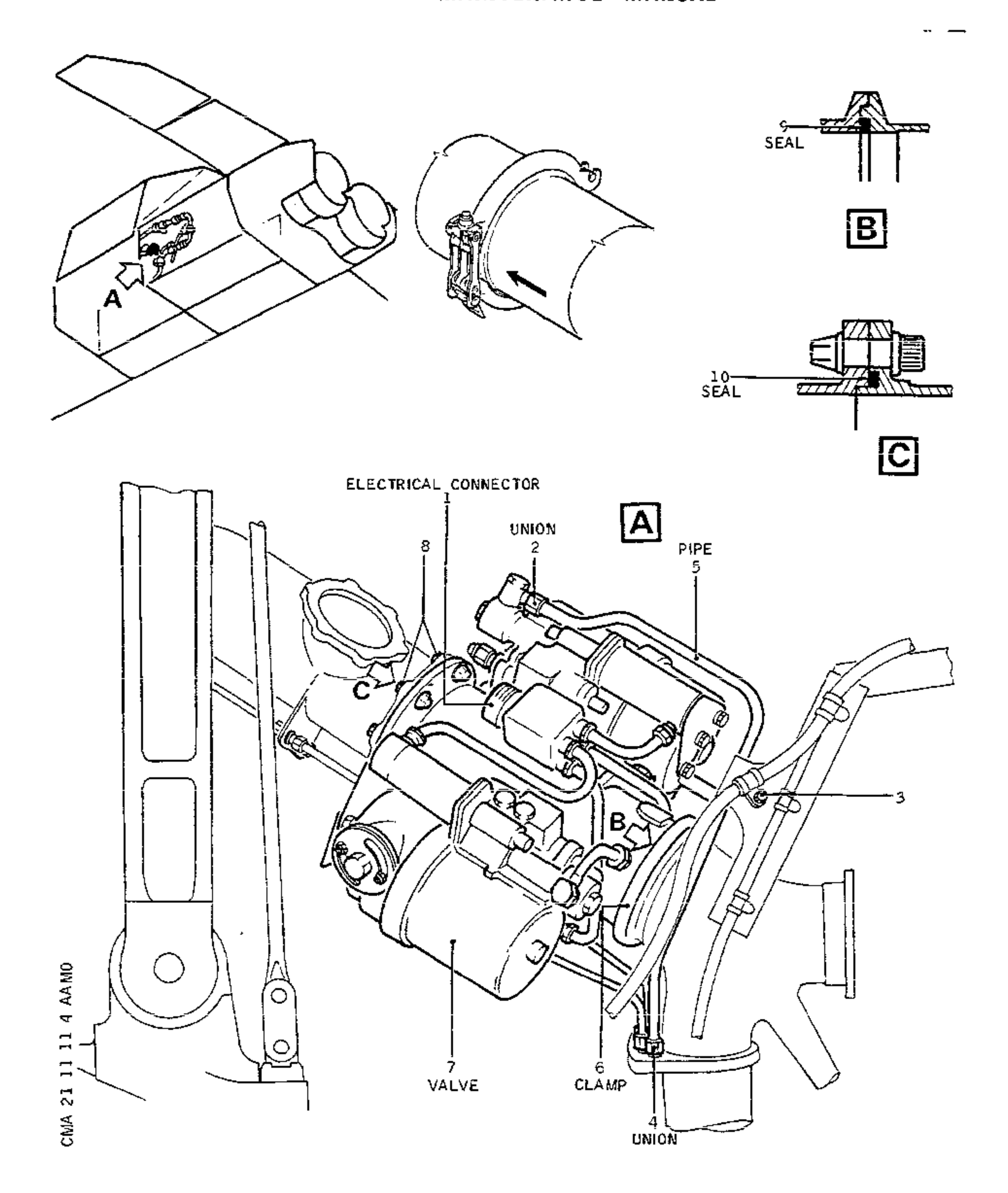
B E. Deleted

F. Close-up

(1) Remove access platform.

(2) Close access door.

(3) Remove safety clip and tag and reset the circuit breaker tripped in paragraph 2.B.(1).



R Dual Pressure Reducing Shut-Off Valve
Figure 401

DUAL PRESSURE REDUCING SHUT-OFF VALVE - ADJUSTMENT/TEST

1. General

The purpose of this test is to check the valve for evidence of leakage and security of attachment after a removal/installation operation. The test covers the 4 valves.
The valves are located on RH side of engines 2 and 4 and on LH side of engines 1 and 3.

2. Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Ground Air Supply Unit : - Relative Minimum Pressure : 2 bars, airflow 0.4 kg/sec - Relative Maximum Pressure : 4.5 bars, airflow 0.6 kg/sec (Temperature must not exceed 300°	
Coupling Equipment - Ground Air Supply Unit	D921603000
**ON A/C ALL	
B	or 3BA11377 in con-
B	junction with trolly
B	12-J042-1E (Code
B	GEET 0627)

B. Prepare

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 21-41-00, S).

(2) Remove blanking plate from bent duct located upstream of the valve and connect coupling equipment.

(3) Connect the ground air supply unit.

(4) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GR1 ENG1 B/VALVE CONT & OVER PRESS IND	1-213	1H 611	D10
GR2 ENG2 B/VALVE CONT & OVER PRESS IND	5-213	2H 611	A 8
GR3 ENG3 B/VALVE CONT & OVER PRESS IND	15-215	3H 611	D 4
GR4 ENG4 B/VALVE CONT & OVER PRESS IND	15-216	4H 611	A23

C. Test

(1) Operate the ground air supply unit.

(2) On AIR BLEED CONTROL panel 2-214, position BLEED VALVE switch in OPEN position.
BLEED VALVE magnetic indicator displays a vertical stripe which indicates that the valve is open.
Make certain that pressure gauge indicates a certain pressure value.

(3) Check for leaks at level of the valve attachment clamp and flange.

(4) Press OVER PRESS caption light
- BLEED VALVE magnetic indicator displays horizontal stripes.
- Pressure gauge returns to zero.
- OVER PRESS caption light and AIR warning light come on, the gong sounds.
- Release OVER PRESS caption light.
- OVER PRESS and AIR warning lights go off ; the gong stops.
- BLEED VALVE magnetic indicator displays vertical stripes.
- Pressure value increases at pressure gauge.

(5) Place BLEED VALVE switch in SHUT position ; BLEED VALVE magnetic indicator displays a horizontal stripe which indicates that the two sections of the valve are closed.

(6) Shut down ground air supply unit.

D. Close-Up

(1) Disconnect ground air supply unit.

(2) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(3) Remove coupling equipment and install blanking plate.

RB (4) Dry cycle engine (Ref. 71-00-00, Adjustment/Test
RB Paragraph 9, Test No.1) and check blanking plate for
RB leaks.

PRESSURE RELIEF VALVE - REMOVAL/INSTALLATION

1. General

The removal/installation procedure is identical for the pressure relief valve of each air conditioning group. These valves are located on the RH side of engines 2 and 4 and on the LH side of engines 1 and 3.

2. Pressure Relief Valve

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 1.8 m (5 ft. 11 in.)	

B. Prepare

(1) Install access platform.

(2) Open access doors
415CL for group 1
426CR for group 2
435CL for group 3
446CR for group 4.

C. Remove (Ref. Fig. 401)

(1) Remove clamp (1) ; remove pressure relief valve (2) ; discard seal (3).

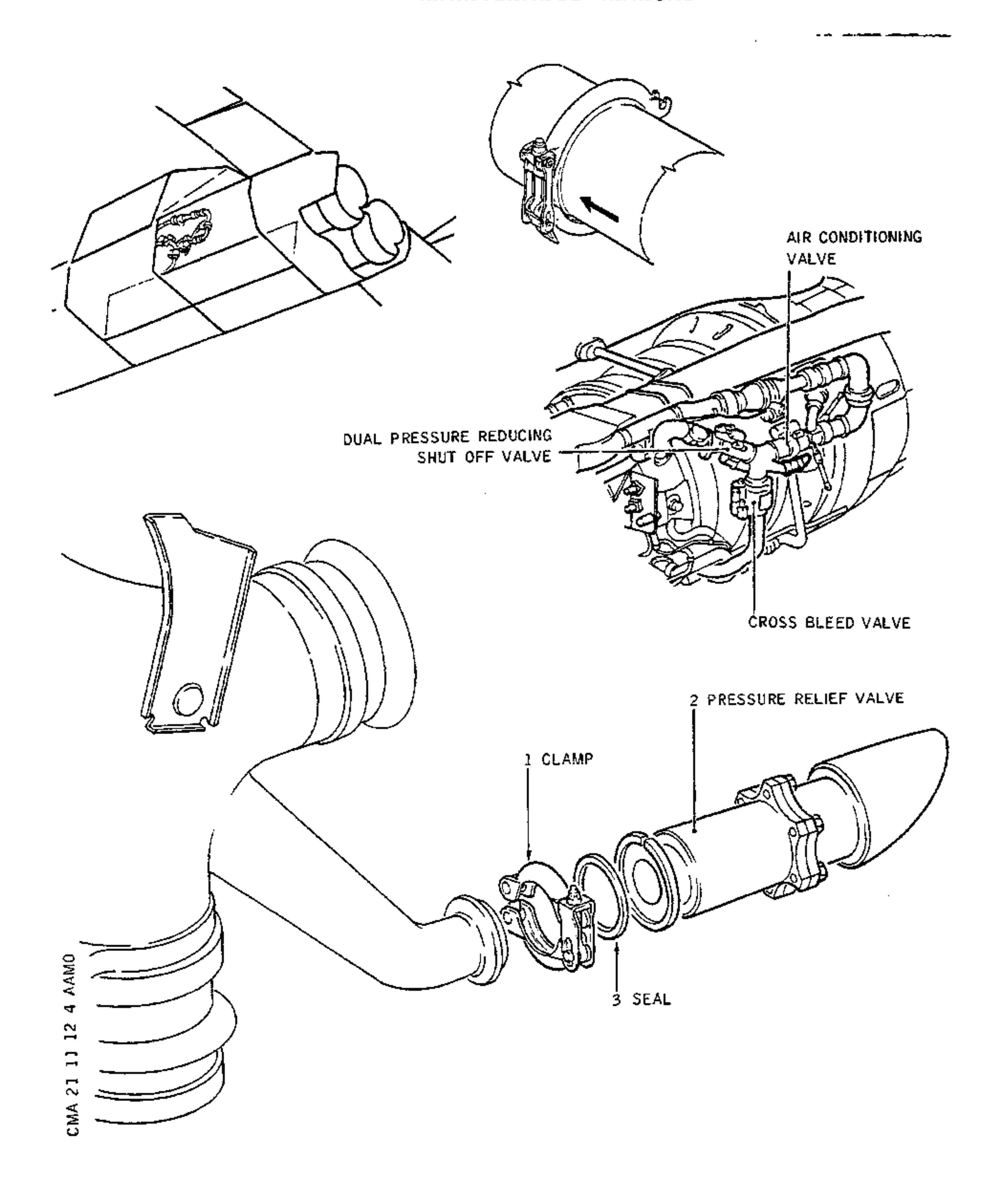
D. Install

(1) Install pressure relief valve (2) fitted with a new seal (3) ; attach with clamp (1).
Tighten clamp. Torque to between 55 and 60 lbf. in. (0.621 to 0.677 mdaN).
R Clamp attachment must be located on side of duct
R marked with an arrow.

E. Close-Up

(1) Close access door.

(2) Remove access platform.



R Pressure Relief Valve
Figure 401

PRESSURE RELIEF VALVE - ADJUSTMENT/TEST

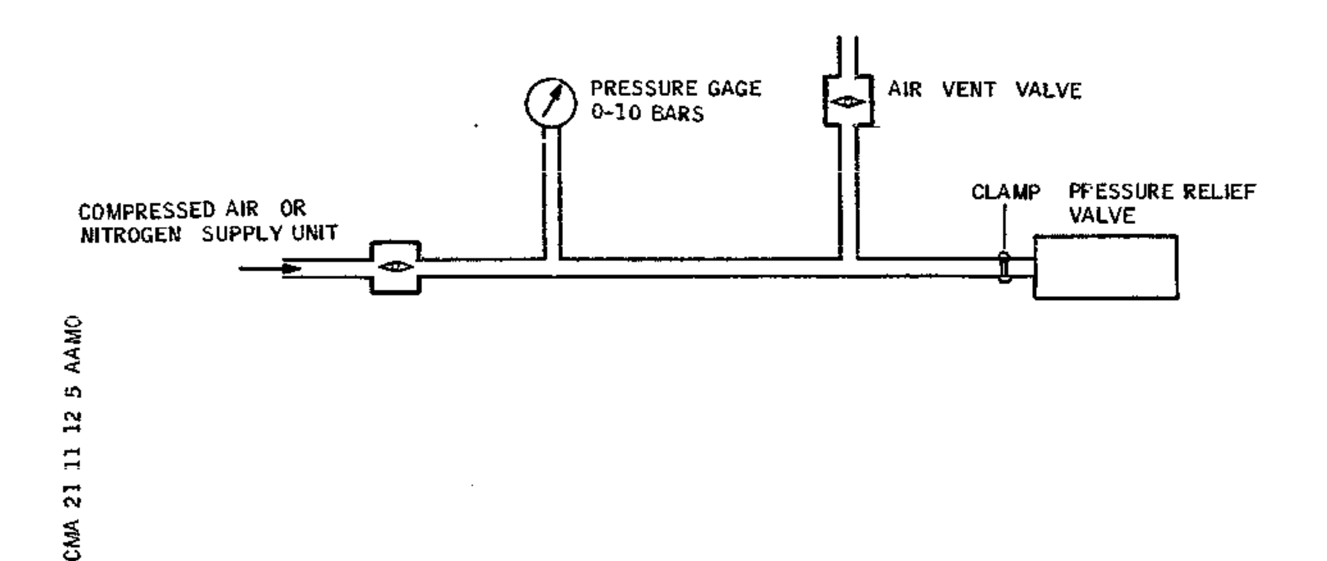
1. General

Checking of pressure relief valve setting. The checking procedure is identical for each air conditioning group.

2. Operational Test

A. Equipment and Materials

DESCRIPTION	PART NO.
A Test Equipment Arranged According to the Following Figure	



Installation for Test
Figure 501

B. Prepare

R R R (1) Remove pressure relief valve (Ref. 21-11-12, Removal/Installation).

C. Test

(1) Install test equipment on removed pressure relief valve.

R (2) Pressurize ; the valve must open for a pressure value of 5.2 ± 0.3 bars (75 ± 4.3 psi).

R (3) Depressurize ; the valve must close.

(4) Shut down pressurized air supply unit ; open air vent valve ; retain pressure relief valve.

D. Close-Up

R R (1) Install pressure relief valve (Ref. 21-11-12, Removal/Installation).

AIR CONDITIONING VALVE - REMOVAL/INSTALLATION

1. General

The removal/Installation procedure is identical for the 4 valves. The valves are located on RH side of engines 2 and 4 and on LH side of engines 1 and 3.

2. Air Conditioning Valve

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform	
Circuit Breaker Safety Clips	

B. Prepare

(1) Position access platform.

(2) On the nacelle, open access door :

415CR for Group 1 air conditioning valve
426CR for Group 2 air conditioning valve
435CL for Group 3 air conditioning valve
446CR for group 4 air conditioning valve

R (3) Trip, safety and tag one of the following circuit brea-
R kers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1 GRP1 AIR COND VALVE CLOSE & AIR GEN IND	1-213	1H 612	D11
Group 2 GRP2 AIR COND VALVE CLOSE & AIR GEN IND	5-213	2H 612	A 9
Group 3 GRP3 AIR COND VALVE CLOSE & AIR GEN IND	15-215	3H 612	A 3

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 4 GPR4 AIR COND VALVE CLOSE & AIR GEN IND	15-216	4H 612	A24

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1).

(2) Remove clamps (2) and (5), discard seals (3) and (6).

(3) Remove air conditioning valve (4).

D. Preparation of Replacement Component

Not applicable.

E. Install

(1) Install air conditioning valve (4) equipped with new seals (3) and (6).

(2) Install clamps (2) and (5).

<u>CAUTION</u> : THE CLAMP MUST BE INSTALLED WITH GREAT CARE. TORQUE TO 0.6 m.daN (53.082 lbf in.) CLAMP ATTACHMENT MUST BE LOCATED ON SIDE
RB OF DUCT MARKED WITH AN ARROW. TORQUE LOAD
RB FOR POST MOD 21C100 AVICA CLAMPS IS
RB 120 lbs/ins.

(3) Connect electrical connector (1).

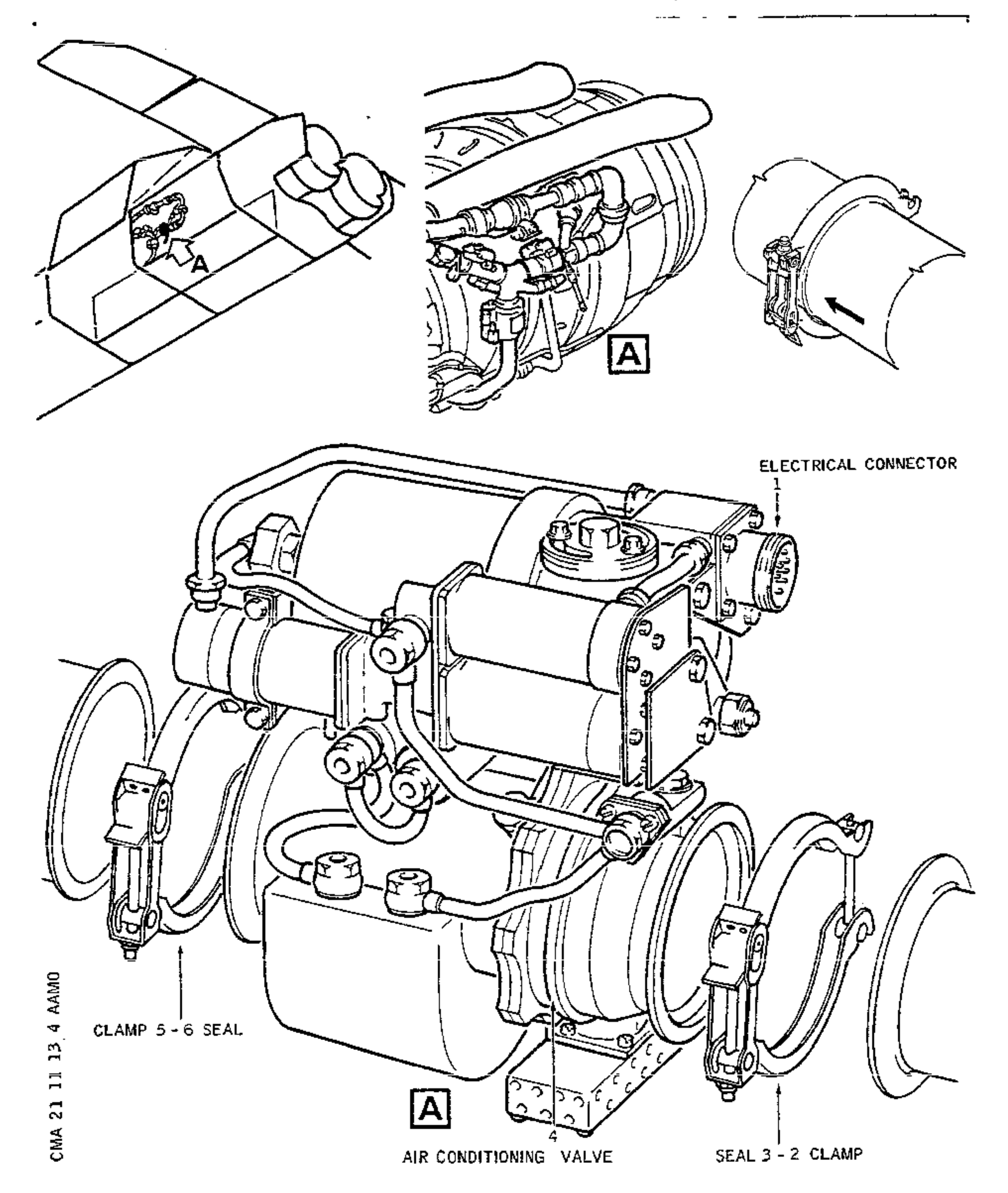
B E. Deleted

F. Close-Up

(1) Close access door.

(2) Remove safety clip and tag and reset the circuit breaker tripped in paragraph 2.B.(2).

(3) Remove access platform.



R

Air Conditioning Valve
Figure 401

AIR CONDITIONING VALVE - ADJUSTMENT/TEST

1. General

The purpose of this test is to check the valve for evidence of leakage and security of attachment after a removal/installation operation.
The test covers the four valves.

2. Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Ground Air Supply Unit - Relative Minimum Pressure 2 bars, airflow 0.4 kg/sec - Relative Maximum Pressure 4.5 bars, airflow 0,6 kg/sec (Temperature must not exceed 300°C)	
R - Circuit breaker safety clips	

B. Prepare

(1) Connect electrical ground power unit and energize the
R aircraft electrical network (Ref. 24-41-00, Servicing).

R (2) Connect the ground air supply unit.

(3) On AIR BLEED CONTROL panel 2-214, check that BLEED VALVE and CROSS BLEED switches are in SHUT position and that COND VALVE switch is in OFF position.

(4) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GR1 AIR COND VALVE CLOSE AND AIR GEN. IND.	1-213	1H 612	D11
GR2 "	5-213	2H 612	A 9
GR3 "	15-215	3H 612	A 3
GR4 "	15-216	4H 612	A24

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GR1 AIR COND VALVE EMERG CLOSE SUP	1-213	1H 667	F13
GR2 "	5-213	2H 667	A10
GR3 "	15-215	3H 667	F 2
GR4 "	15-216	4H 667	F26
GR1 AIR GEN CONT AND IND	1-213	1H 862	D13
GR2 "	5-213	2H 862	F 9
GR3 "	15-215	3H 862	B 4
GR4 "	15-216	4H 862	B23

(5) Pressurize Fuel System

WARNING : OBSERVE FUEL SYSTEM SAFETY PRECAUTIONS DESCRIBED IN 28-00-00 AND 28-10-00.

NOTE : Pressurization assumes a minimum quantity of fuel of 2500 Kg in the appropriate feed tank (1, 2, 3, 4).

On centre console, place throttle control levers in SHUT position (lower mechanical stop).

Check that crossfeed valves are closed and that associated magnetic indicators display vertical stripes.

With the LP VALVE switch locked at OPEN by the switch guard, check that the associated magnetic indicator shows an in-line indication.

Place the first of the three ENGINE FEED PUMPS control switches in ON position (MAIN PUMP).

Engine 1 Main Fuel Pump for group 1
Engine 2 Main Fuel Pump for group 2
Engine 3 Main Fuel Pump for group 3
Engine 4 Main Fuel Pump for group 4

Check that corresponding LOW PRESS indicator light goes off when pump operating pressure is reached.

WARNING : FUEL SYSTEM MUST NOT OPERATE MORE THAN 2 HOURS.

In case Fuel System cannot be used.
Trip, safety and tag the following circuit breakers :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
For GRP 1 LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
For GRP 2 LH UC WEIGHT SW B SYS SUP	3-213	G 293	B 8
For GRP 3 RH UC WEIGHT SW B SYS SUP	3-213	G 294	B 9
For GRP 4 RH UC WEIGHT SW A SYS SUP	1-213	G 295	M18

WARNING : DURING TEST, FUEL EXCH WARNING LIGHT MAY ILLUMINATE. ON PANEL 2-214 PLACE FUEL VALVE SWITCH IN OPEN POSITION (SELF-HOLDING CANCELLATION).

C. Tests

R Pressurize the aircraft.
On AIR BLEED CONTROL panel 2-214, place CROSS BLEED switch in OPEN position. CROSS BLEED magnetic indicator displays a horizontal stripe ; pressure value increases on pressure indicator ; COND VALVE switch is in ON position.
Wait for a while ; the air conditioning valve must open. Check that it opens on COND VALVE magnetic indicator ; it displays a vertical stripe.
Air flow must increase. Check that this occurs on MASS FLOW
R indicator on TEMPERATURE CONTROL panel.

On panel 23-214 :
Place AIR COND TEST switch in COND position of Group to be checked.
Place AIR COND TEST switch in test position.
After a lapse of 2 seconds COND VALVE magnetic indicator displays a horizontal stripe.
R MASS FLOW indicator indicates that flow decreases down to zero.
Place AIR COND TEST switch in OFF position and AIR COND TEST selector switch in OFF position.
COND VALVE magnetic indicator returns to the vertical position. MASS FLOW indicator indicates normal flow.

Check for evidence of leaks at level of air conditioning valve attachment clamps in engine nacelle :

Door 415 CL for GR1
426 CR for GR2
435 CL for GR3
446 CR for GR4

R R On AIR BLEED CONTROL panel 2-214, place COND VALVE switch in OFF position. Reading on MASS FLOW indicator must be zero. Place CROSS BLEED switch in SHUT position ; CROSS BLEED magnetic indicator displays a vertical stripe.

D. Close-Up

(1) Shut down ground air supply unit and disconnect it from the aircraft.

(2) In case the Fuel System has been pressurized

Place ENGINE FEED PUMP switch in OFF positionn. After a few seconds the corresponding LOW PRESS indicator light must illuminate.

If necessary, remove safety clip and tag and reset circuit breaker tripped in paragraph 2 B (5).
If FUEL EXCH warning has come on during test after switching off the ground air supply unit, wait for cancellation of warning and place FUEL VALVE switch in AUTO position.

(3) De-energize the aircraft electrical network and disconnect electrical ground power unit.

MASS FLOW CONTROL VALVE - REMOVAL/INSTALLATION

1. General

R The removal/Installation procedure is identical for the mass flow control valve of each group. These valves are located on RH side of engines 2 and 4 and on LH side of engines 1 and 3.

2. Mass Flow Control Valve

A. Equipment and Materials

DESCRIPTION	PART NO.
Access platform 1.8 (5 ft. 11 in.)	
Circuit breaker safety clip	

B. Prepare

(1) Position access platform

(2) On nacelle, open access door

415CL for mass flow control valve of Group1
426CR for mass flow control valve of Group2
435CL for mass flow control valve of Group3
446CR for mass flow control valve of Group4

R (3) Trip, safety and tag one of the following circuit
R breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1 GRP1 AIR COND VALVE CLOSE & AIR GEN IND	1-213	1H 612	D11
Group 2 GRP2 AIR COND VALVE CLOSE & AIR GEN IND	5-213	2H 612	A 9
Group 3 GRP3 AIR COND VALVE CLOSE & AIR GEN IND	15-215	3H 612	A 3

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 4 GPR4 AIR COND VALVE CLOSE & AIR GEN IND	15-216	4H 612	A24

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (5).

(2) Disconnect both unions (2) and (3).

(3) Remove both clamps (1) and (4).

(4) Remove mass flow control valve (6). Discard seals.

D. Install

(1) Install mass flow control valve (6) equipped with new seals.

(2) Install clamps (1) and (4).

(3) Install unions (2) and (3).

<u>CAUTION</u> : THE CLAMP MUST BE INSTALLED WITH GREAT CARE TORQUE TO 0.6 m.daN (53.082 lbf in.). CLAMP ATTACHMENT MUST BE LOCATED ON SIDE OF
RB DUCT MARKED WITH AN ARROW. TORQUE LOAD FOR
RB POST MOD 21C100 AVICA CLAMPS IS 120 lbs/ins.

(4) Tighten clamps (1) and (4).

(5) Tighten unions :

(a) Union (2). Torque to 100/200 lbf in (1.1 to 2.2 m.daN)

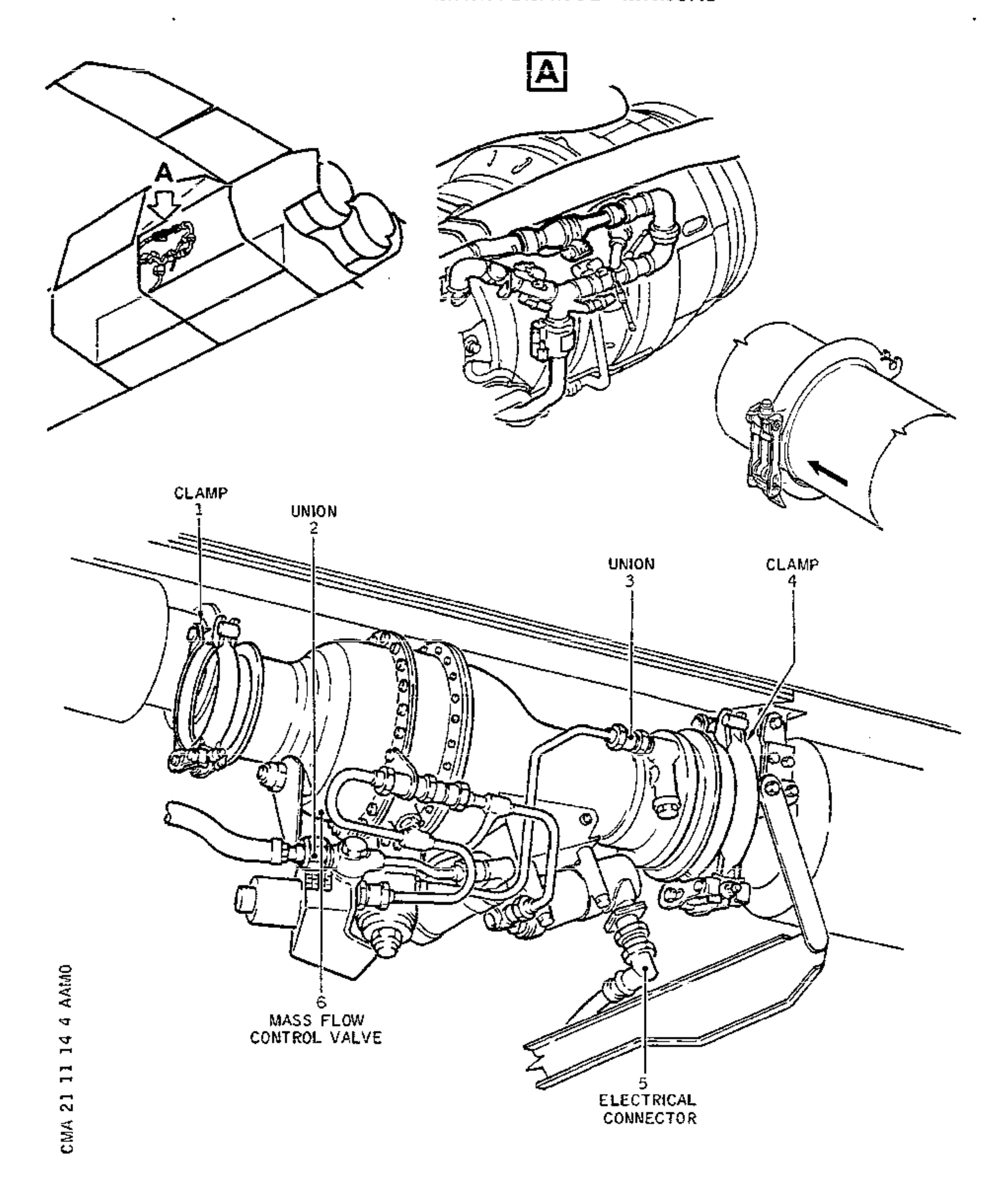
(b) Union (3). Torque to 70/120 lbf in. (0.77 to 1.32 m.daN).

(6) Connect electrical connector (5).

B E. Deleted

F. Close-Up

(1) Close access door.



R Mass Flow Control Valve
Figure 401

(2) Remove access platform.

(3) Remove safety clip and tag and reset the circuit breaker tripped in paragraph 2 B (2).

MASS FLOW CONTROL VALVE - ADJUSTMENT/TEST

1. General

The purpose of this test is to check the mass flow control valve for evidence of leakage and security of attachment. This operation covers the four mass flow control valves.

2. Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Ground Air Supply Unit : - Relative Minimum Pressure, airflow 0.4 Kg/sec. - Relative Maximum Pressure, airflow 0.6 Kg/sec. - Temperature must not exceed 300° C.	
Electrical Ground Power Unit	
R Circuit Breaker Safety Clips	

B. Prepare

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, S).

(2) Connect the ground air supply unit.

(3) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GP1 AIR GEN IND CONT&IND	1-213	1H862	D13
GP2 AIR GEN IND CONT&IND	5-213	2H862	F 9
GP3 AIR GEN IND CONT&IND	15-215	3H862	B 4
GP4 AIR GEN IND CONT&IND	15-216	4H862	B23

R (4) Pressurize Fuel System (28-00-00)

WARNING : OBSERVE FUEL SYSTEM SAFETY PRECAUTIONS DESCRIBED IN 28-00-00 AND 28-10-00.

NOTE : Pressurization assumes a minimum quantity of fuel of 2500 Kg in the appropriate feed tank (1, 2, 3, 4).

On centre console, place throttle control levers in SHUT position (lower mechanical stop).

Check that crossfeed valves are closed and that associated magnetic indicators display vertical stripes.

With the LP VALVE switch locked at OPEN by the switch guard, check that the associated magnetic indicator shows an in-line indication.

Place the first of the three ENGINE FEED PUMPS control switches in On position (MAIN PUMP).

Engine 1 Main Fuel Pump for group 1
Engine 2 Main Fuel Pump for group 2
Engine 3 Main Fuel Pump for group 3
Engine 4 Main Fuel Pump for group 4

Check that corresponding LOW PRESS indicator light goes off when pump operating pressure is reached.

WARNING : FUEL SYSTEM MUST NOT OPERATE MORE THAN 2 HOURS.

In case Fuel System cannot be used.
Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
For GRP 1 LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
For GRP 2 LH UC WEIGHT SW B SYS SUP	3-213	G 293	B 8
For GRP 3 RH UC WEIGHT SW B SYS SUP	3-213	G 294	B 9
For GRP 4 RH UC WEIGHT SW A SYS SUP	1-213	G 295	M18

R WARNING : DURING TEST, FUEL EXCH WARNING LIGHT MAY
R ILLUMINATE. ON PANEL 2-214 PLACE FUEL VAL-
R VE SWITCH IN OPEN POSITION (SELF-HOLDING
R CANCELLATION).

C. Test

(1) Operate the ground air supply unit.

(2) On AIR BLEED CONTROL panel, place CROSS BLEED switch of group to be tested in OPEN position.

(3) On AIR BLEED CONTROL panel, place COND VALVE switch in ON position. Magnetic indicator displays a vertical stripe.

(4) On TEMPERATURE CONTROL panel 2-214 MASS FLOW indicator must indicate a certain value.

(5) Check for evidence of leakage at level of mass flow control valve attachment clamps.

(6) On AIR BLEED CONTROL panel, place COND VALVE switch in BOOST position. On TEMPERATURE CONTROL panel MASS FLOW indicator must indicate a value greater than that in paragraph 2. C (4).

(7) On AIR COND TEST panel 23-214, place test switch in FLOW position.

(8) On panel 23-214, place AIR COND switch in TEST position.

(9) MASS FLOW indicator indicates 0 - mass flow control valve closes. Magnetic indicator displays a vertical
R stripe which indicates that air conditioning valve is open.

(10) Place AIR COND switch in NORMAL position.

(11) MASS FLOW indicator shows that airflow is normal.

(12) Place test switch in OFF position.

(13) Place CROSS BLEED switch in SHUT position and COND VALVE switch in OFF position.

(14) Shut down ground air supply unit.

D. Close-Up

(1) In case the Fuel System has been pressurized.

Place ENGINE FEED PUMP switch in OFF position. After a few seconds the corresponding LOW PRESS indicator light must illuminate.

If necessary, remove safety clip and tag and reset circuit breaker tripped in paragraph 2 B (4). If FUEL EXCH warning has come on during test after switching off the ground air supply unit, wait for cancellation of warning and place FUEL VALVE switch in AUTO position.

(2) De-energize the aircraft electrical network and disconnect electrical ground power unit.

(3) Disconnect ground air supply unit.

B 3. Pneumatic Pipe Leak Check

RB A. Pipe to pneumatic temperature sensor.

RB (1) Disconnect flexible pipe at mass flow control valve pneumatic temperature sensor connection (see 21-11-00 Fig.011).

RB (2) Apply shop air line pressure (80 P.S.I.G. MAX) to flex pipe union.

RB (3) Check pipe run from mass flow control valve to pneumatic temperature sensor for leakage with leak detection fluid.

RB (4) Remake leaking joints, change leaking pipes.

RB (5) Shut off and remove air line. Reconnect flex pipe.

RB B. Pipe to reservoir leak check.

RB (1) Disconnect pipe at mass flow control valve.

RB (2) Apply shop air line pressure (80 P.S.I.G. MAX) to pipe union.

RB (3) Check pipe run from mass flow control valve to reservoir for leakage with leak detection fluid.

RB (4) Remake leaking joints, change leaking pipes.

RB (5) Shut off and remove air line. Reconnect pipe.

PNEUMATIC TEMPERATURE SENSOR - REMOVAL/INSTALLATION

1. General

The removal/installation operation is identical for the pneumatic temperature sensors of each group.

2. Pneumatic Temperature Sensor

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 1.8 m (5 ft. 11 in.)	
Corrosion Resistant Steel Lockwire Dia 0.032 in. (0.8 mm)	

B. Prepare

(1) Position access platform.

(2) Open access doors :
415AL for group 1 temperature sensor
426AR " group 2 " "
435AL " group 3 " "
446AR " group 4 " "

C. Remove (Ref. Fig. 401)

(1) Loosen union (1).

(2) Cut and remove lockwire, remove screws (2) and retain washers (3).

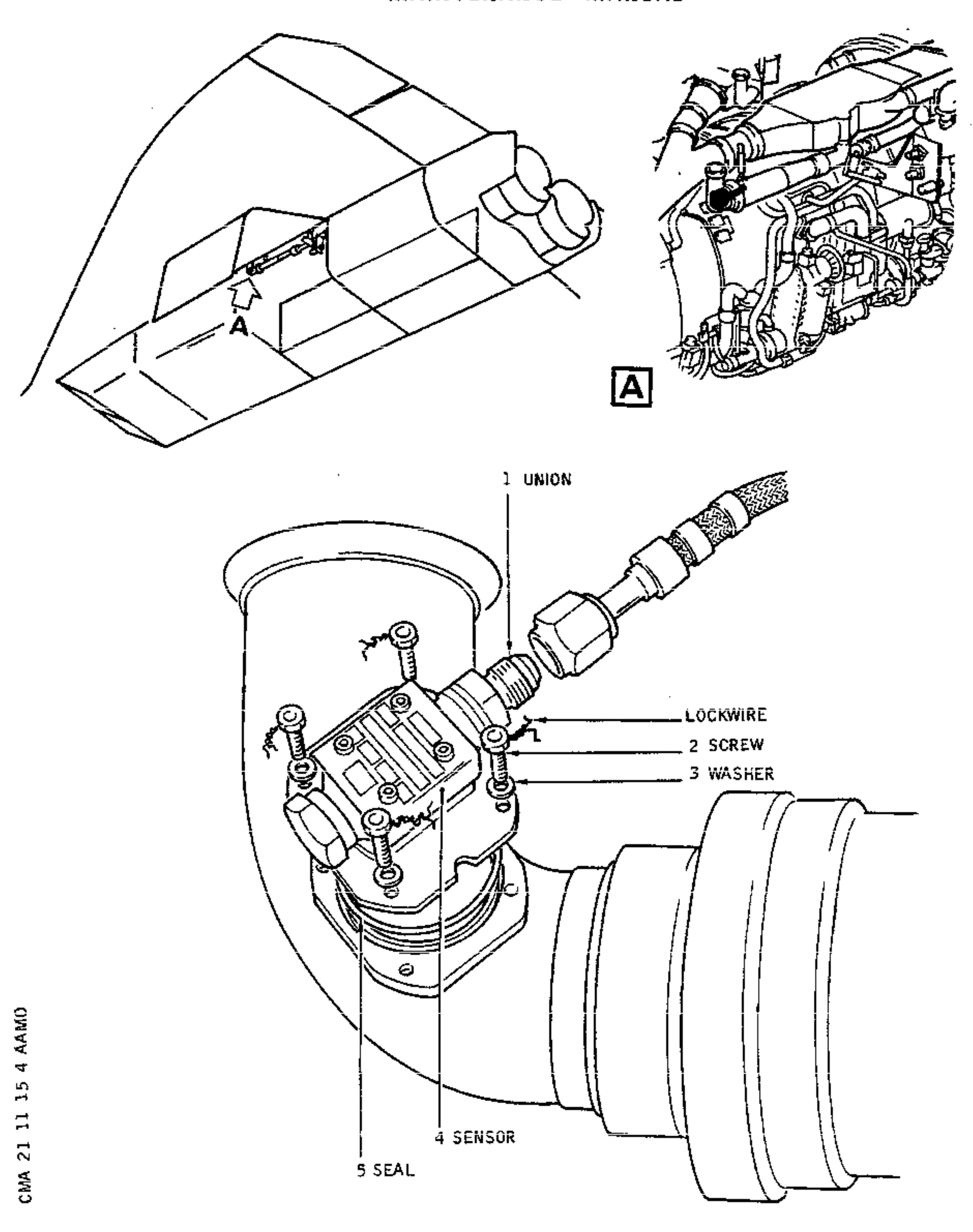
(3) Remove pneumatic temperature sensor (4) and discard seal (5).

D. Install

(1) Install pneumatic temperature sensor (4) fitted with new seal (5).

(2) Install screws (2) and washers (3).

(3) Tighten screws (2). Torque to between 30 and 40 lb.f. in (0.23 and 0.34 m.daN) and safety with lockwire.



Pneumatic Temperature Sensor
Figure 401

(4) Install union (1).

E. Close-Up

(1) Close access door.

(2) Remove access platform.

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OVERPRESSURE SWITCH - REMOVAL/INSTALLATION

1. General

Removal for replacement
There are two overpressure switches per air conditioning group. Their removal is identical. They are located on RH side of engines 2 and 4 and on LH side of engines 1 and 3.

2. Overpressure switch

A. Equipment and Materials

DESCRIPTION	PART NO.
Access platform 1.8 m (5 ft. 11 in.)	
Circuit Breaker Safety Clips	

B. Prepare

R R (1) Trip, safety and tag one of the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1 ENG1 B/VALVE CONT & OVER PRESS IND	1-213	1H 611	D10
Group 2 ENG2 B/VALVE CONT & OVER PRESS IND	5-213	2H 611	A 8
Group 3 ENG3 B/VALVE CONT & OVER PRESS IND	15-215	3H 611	A 4
Group 4 ENG4 B/VALVE CONT & OVER PRESS IND	16-215	4H 611	A23

(2) Position access platform.

R (3) On nacelle, open access door

R 415AL for group 1 overpressure switch
R 426AR for group 2 overpressure switch
R 435AL for group 3 overpressure switch
R 446AR for group 4 overpressure switch

C. Remove (Ref. fig. 401)

(1) Disconnect electrical connector (1)

(2) Unscrew union (2)

R (3) Remove overpressure switch attaching screws (3)

(4) Remove overpressure switch A.
The removal procedure is identical for overpressure switches A and B.

(5) Remove adaptor (4) from removed overpressure switch.

D. Preparation of Replacement Component

(1) Install adaptor (4) on replacement overpressure switch.

E. Install

(1) Install overpressure switch.

(2) Install union (2)

R (3) Install overpressure switch attaching screws (3)

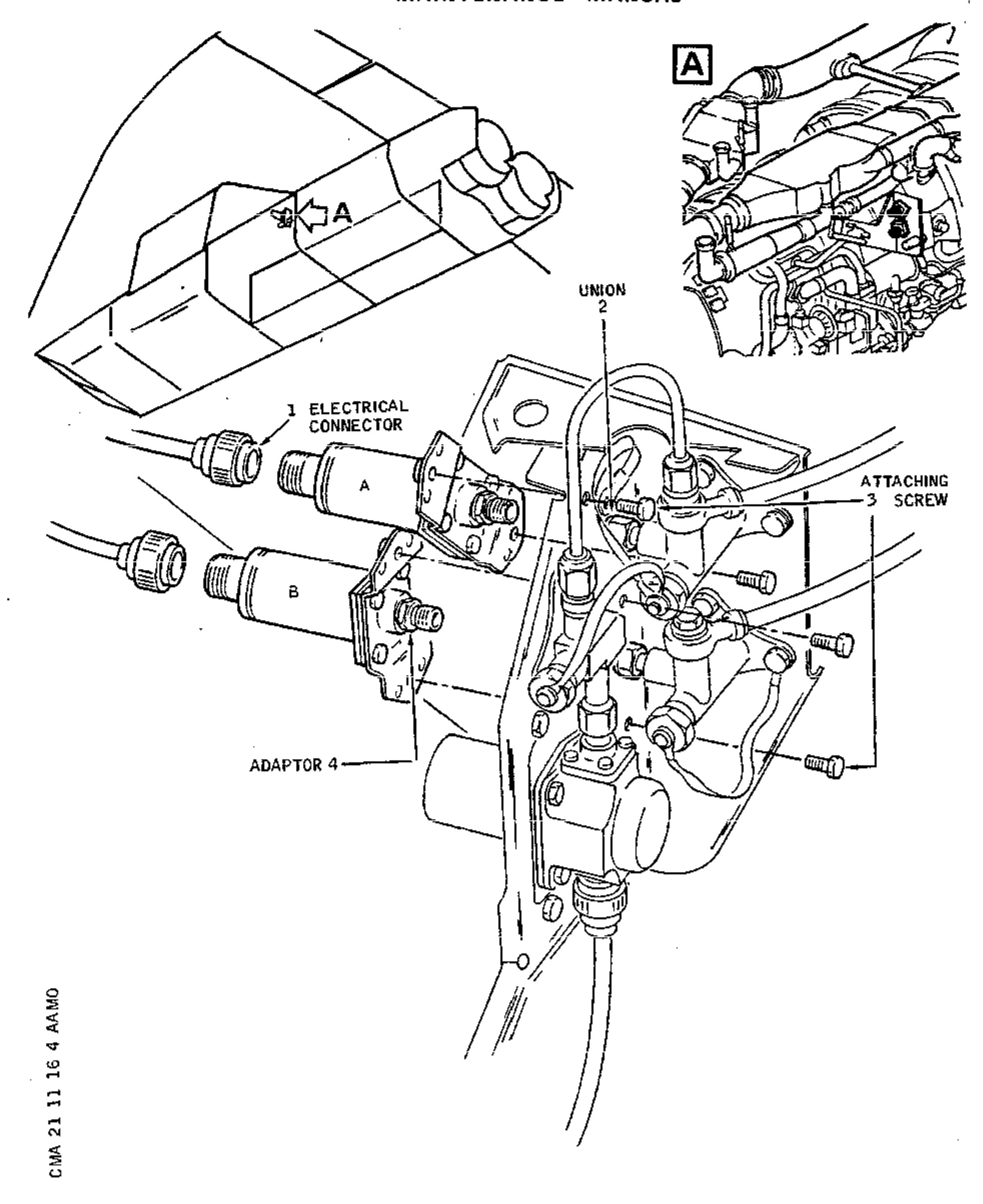
(4) Connect electrical connector (1).

F. Close-Up

(1) Close access door.

(2) Remove safety clip and tag and reset the circuit breaker tripped in paragraph 2 B (2).

(3) Remove access platform.



CMA 21 11 16 4 AAMO

Overpressure Switch
Figure 401

R

OVERPRESSURE SWITCH - ADJUSTMENT/TEST

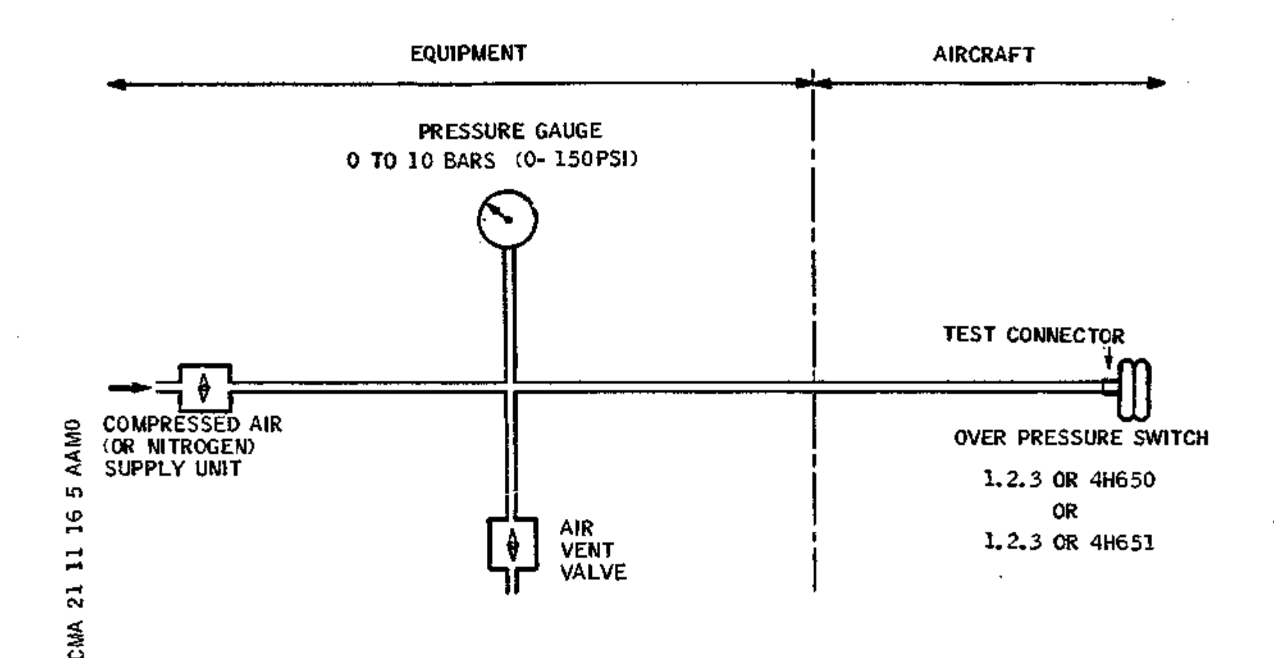
1. General

R The test procedure is identical for the overpressure switches
R of each air conditioning group.

2. Functional Test

A. Equipment and Materials (Ref. Fig. 501)

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Dry compressed air (or nitrogen) supply unit providing a static pressure of 0-10 bars (0-150 psi) Pressure reducing valve, 0-10 bars (0-150 psi)	
R Coupling Adaptors - Testing, Air Conditioning System Component	D921602100
Test equipment arranged according to the following figure	
2 Ground Service Telephones	



Test Equipment
Figure 501

B. Prepare

R (1) According to the group on which the operation of the
R overpressure switches has to be checked, remove one of the following access doors :
415AL for group 1
426AR for group 2
435AL for group 3
446AR for group 4

(2) On overpressure switch 1, 2, 3 or 4H650, unscrew and remove blanking cap from test connector.

R (3) Install coupling adaptor D921602100 and connect the arranged test equipment (Ref. Fig. 501).

R (4) According to the group on which the operation of the
R overpressure switches has to be checked, make certain that the relevant circuit breaker is set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1 ENG1 B/VALVE CONT & OVER PRESS IND	1-213	1H 611	D10
Group 2 ENG2 B/VALVE CONT & OVER PRESS IND	5-213	2H 611	A 7
Group 3 ENG3 B/VALVE CONT & OVER PRESS IND	15-215	3H 611	A 3
Group 4 ENG4 B/VALVE CONT & OVER PRESS IND	15-216	4H 611	A23

(5) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(6) On AIR BLEED CONTROL panel 2-214 at Flight Engineer's station, place the BLEED VALVE switch of the relevant group (ENG 1, 2, 3 or 4) in OPEN position and COND VALVE switch in ON position.

(7) Connect the ground service telephones : one in the flight compartment, the other one in the vicinity of group 1 (or 2 or 3 or 4).

C. Test

(1) Apply a gradually increasing pressure to the overpressure switch :

- When the pressure on the gauge reaches 85 ± 3 psi (5.86 ± 0.2 bars), the OVER PRESS indicator light of the associated group (ENG 1, 2, 3 or 4) on Flight Engineer's AIR BLEED CONTROL panel 2-214 and master warning light must come one.

RB (2) Check sense lines for leaks at joints and flexible pipes.

(3) Slowly bring back pressure to zero.

The master warning light and OVER PRESS warning light remain illuminated, which indicates that self holding system and diode 1 (2, 3, 4)H907 operate correctly.

R (4) Return BLEED VALVE switch to SHUT position.
OVER PRESS warning light and master warning light go off.
Return COND VALVE switch to OFF position.

The functional test of the second overpressure switch 1, 2, 3 or 4H651 is identical to the test of the first overpressure switch of the same group.

D. Close-Up

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref.24-41-00, Servicing).

(2) Disconnect test equipment and coupling adapter D921602100.

(3) Install the blanking cap on the overpressure switch test connector. Torque to between 60 and 70 lbf.in. (0.677 and 0.790 m.daN).

(4) Close access doors.

(5) Disconnect the ground service telephones.

AIR DUCT PRESSURE TRANSMITTER - REMOVAL/INSTALLATION

1. General

The removal/installation procedure is identical for the pressure transmitters of each group. The air duct pressure transmitters are located on RH side of engines 2 and 4 and on LH side of engines 1 and 3.

2. Pressure Transmitter

A. Equipment and Materials

DESCRIPTION	PART NO.
Access platform 1.8 m (5 ft. 11 in.)	
Circuit breaker safety clip	

B. Prepare

(1) Position access platform.

(2) On nacelle, open access doors :

R 415AL for removal of Group1 pressure transmitter
R 426AR for removal of Group2 pressure transmitter
R 435AL for removal of Group3 pressure transmitter
R 446AR for removal of Group4 pressure transmitter

R (3) Trip, safety and tag one of the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1 ENG1 CHARGE AIR PRESS IND	13-215	1H 864	D 2
Group 2 ENG2 CHARGE AIR PRESS IND	13-216	2H 864	B20
Group 3 ENG3 CHARGE AIR PRESS IND	13-215	3H 864	F 3

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 4 ENG4 CHARGE AIR PRESS IND	13-216	4H 864	B21

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1).

(2) Remove screws (2) attaching plate (3).

(3) Unscrew union (4).

(4) Remove pressure transmitter (5) and plate (3).

(5) Remove screws (6) attaching pressure transmitter (5) to plate (3).

D. Preparation of Replacement Component

(1) Attach pressure transmitter (5) to plate (3) by means of screws (6).

E. Install

(1) Install plate and pressure transmitter.

(2) Install union (4). Torque to between 85 and 150 lbf.in. (between 0.96 and 1.69 m.daN).

(3) Install screws (2).

(4) Connect electrical connector (1).

F. Test

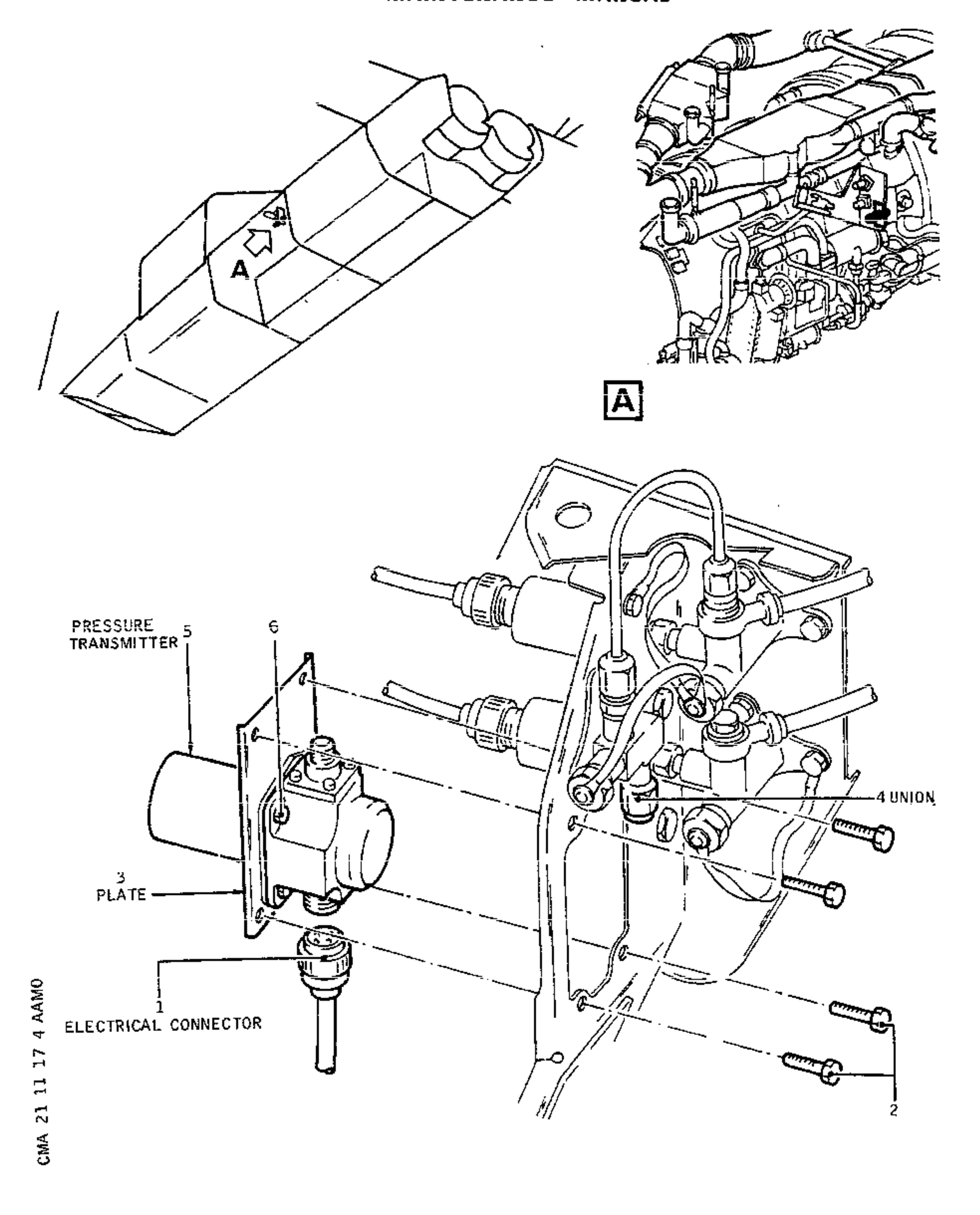
B (1) Functional Test

(Ref. 21-11-17, Adjustment/Test).

G. Close-Up

Close access door.

Remove access platform.



Air Duct Pressure Transmitter
R Figure 401

AIR DUCT PRESSURE TRANSMITTER - ADJUSTMENT/TEST

R 1. Air Pressure Indication Operational Test

R (Ref. 21-11-17, Removal/Installation).

R 2. Functional Test of Air Pressure

A. General

(1) The purpose of this test is to check operation of air duct pressure transmitters (1H/4H892) and of corresponding air pressure indicators (1H/4H891).

(2) Test is identical for the four assemblies, only the location is different.

B. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Compressed Air or Nitrogen Supply Unit Capable of supplying a pressure of 100psi (6,85bars) 1 Pressure gauge 1 Air Vent Valve	
R Coupling Adaptors - Testing, Air Conditioning	D921602100

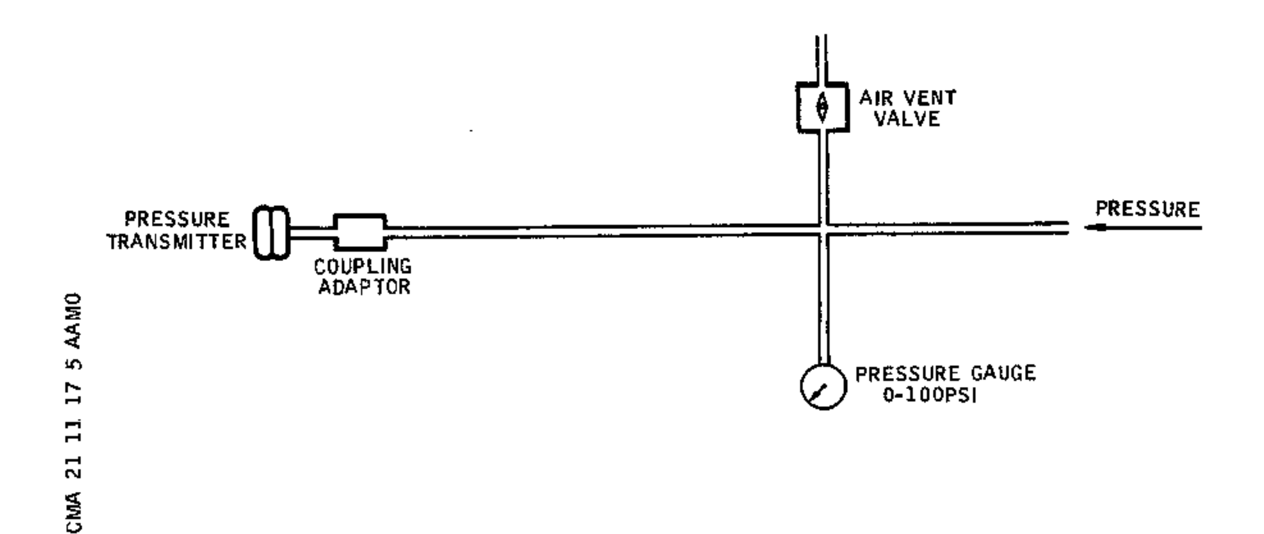
C. Prepare (Ref. Fig. 501)

(1) Gain access to air duct pressure transmitter to be tested (Ref. 21-11-17 Page 401, Removal/Installation).

(2) Remove "In Situ" connector coupling from air duct pressure transmitter and connect test equipment according to the figure

WARNING : BEFORE PROCEEDING WITH TESTS, MAKE CERTAIN THAT THE TEST EQUIPMENT IS FITTED WITH A SAFETY DEVICE PROVIDING ABSORPTION OF POSSIBLE OVERPRESSURE WHICH MIGHT DAMAGE THE DUCT PRESSURE TRANSMITTERS.

(3) Connect electrical ground power unit and energize the



Air Duct Pressure Transmitter Test
Figure 501

aircraft electrical network (Ref. 24-41-00, Servicing).

(4) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG1 CHARGE AIR PRESS IND	13-215	1H 864	D 2
ENG2 CHARGE AIR PRESS IND	13-216	2H 864	B20
ENG3 CHARGE AIR PRESS IND	13-215	3H 864	F 3
ENG4 CHARGE AIR PRESS IND	13-216	4H 864	B21

D. TEST

(1) Make certain that pointer of tested air pressure indicator (panel 2-214) indicates a pressure lower than

5 psi

(2) Apply pressure to pressure transmitter. The position of air pressure indicator (panel 2-214) pointer must correspond to a given pressure read on equipment pressure gauge. The correspondence is shown in the table below

Testing Pressure	Pressure Indicator Reading
0 PSI	0 to 5 PSI
20 PSI	20 ± 3 PSI
40 PSI	40 ± 2,5 PSI
60 PSI	60 ± 2,5 PSI
80 PSI	80 ± 2,5 PSI
100 PSI	100 ± 3 PSI
80 PSI	80 ± 2,5 PSI
60 PSI	60 ± 2,5 PSI
40 PSI	40 ± 2,5 PSI
20 PSI	20 ± 3 PSI
0 PSI	0 to 5 PSI

(3) When pressure is returned to zero, trip the circuit breaker corresponding to the assembly to be tested
R (circuit breaker 1H864/4H864) and make certain that air pressure indicator pointer positions on minimum mechanical stop.

(4) Reset circuit breaker (1H864/4H864)

E. Close Up

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit

(2) Disconnect test equipment and install "in situ" connector coupling on air duct pressure transmitter.
R Torque to between 60 and 70 lbf.in. (0.677 and
R 0.790 m.daN).

(3) Close access doors (Ref. 21-11-17, Page 401, Removal/Installation).

NON-RETURN VALVE - INSPECTION/CHECK

1. General

An inspection/check of the non-return valve shall be carried out during engine removal/installation.

2. Non-Return Valve

A. Inspection/Check

(1) Make certain that the displacement of both flaps on the non-return valve is correct.

(2) Make certain that both flaps seat correctly on the valve body.

(3) Make certain that the valve bears no trace of corrosion.

MASS FLOW SENSOR - REMOVAL/INSTALLATION

1. General

The removal/installation procedure is identical for the mass flow sensors of each air conditioning group. The group 1 and 2 mass flow sensors are located between frames 66 and 67 on the left hand side of the aircraft centreline and group 3 and 4 sensors on the right hand side of the aircraft centreline.

2. Mass Flow Sensors

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 2.96 m (9 ft. 8 in.)	
Circuit Breaker Safety Clips	

B. Prepare

(1) Position access platform.

(2) Open access door 151CB.

(3) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1			
GRP1 TEMP SELECTOR AUTO SUP & CONT	2-213	H1000	B17
GRP1 FUEL VALVE CONT		1H 863	D16
Group 2			
GRP2 TEMP SELECTOR AUTO SUP & CONT	4-213	H1001	E11
GRP2 FUEL VALVE CONT		2H 863	E12
Group 3			
GRP3 TEMP SELECTOR AUTO SUP & CONT	2-213	H1002	G16
GRP3 FUEL VALVE CONT		3H 863	F16

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 4			
GRP4 TEMP SELECTOR AUTO SUP & CONT	4-213	H1003	B12
GRP4 FUEL VALVE CONT		4H 863	B11

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1).

(2) Remove screws (2), retain washers (3).

(3) Remove mass flow sensor (4) ; discard seal (5).

D. Install

(1) Install mass flow sensor (4) fitted with a new seal (5).

(2) Install screws (2) fitted with washers (3).

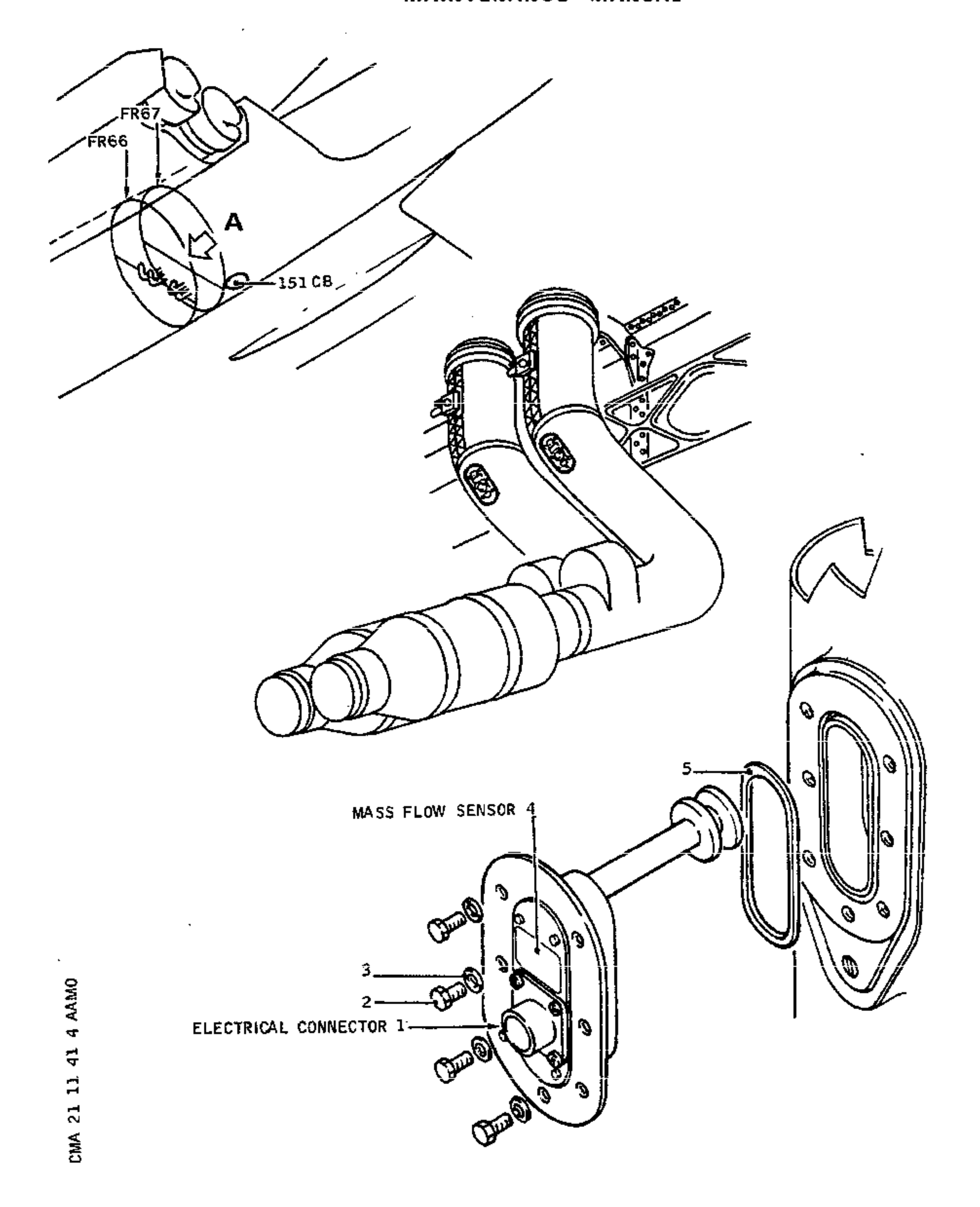
(3) Connect electrical connector (1).

E. Close-Up

(1) Close access door.

(2) Remove access platform.

(3) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2 B (3).



Mass Flow Sensor
Figure 401

NON-RETURN VALVE - REMOVAL/INSTALLATION

1. General

The removal/installation procedure of the non-return valve is identical for each group

2. Non-Return Valve

A. Equipment and Materials

DESCRIPTION	PART NO.
Corrosion resistant steel lockwire 0.7 mm (0.0275 inch)	
O Ring	BAS7180251

B. Prepare

(1) Remove the corresponding cabin isolation valve (Ref. 21-12-42, Page 401, Removal/Installation).

C. Remove (Ref. Fig. 401)

(1) Cut lockwire from attachment screws (1)

(2) Unscrew the 8 attachment screws (1), retain washers (2)

(3) Slightly turn non-return valve (3) in order to remove both attachment pins. Remove non-return valve

D. Preparation of Replacement Component

(1) Install a new O ring

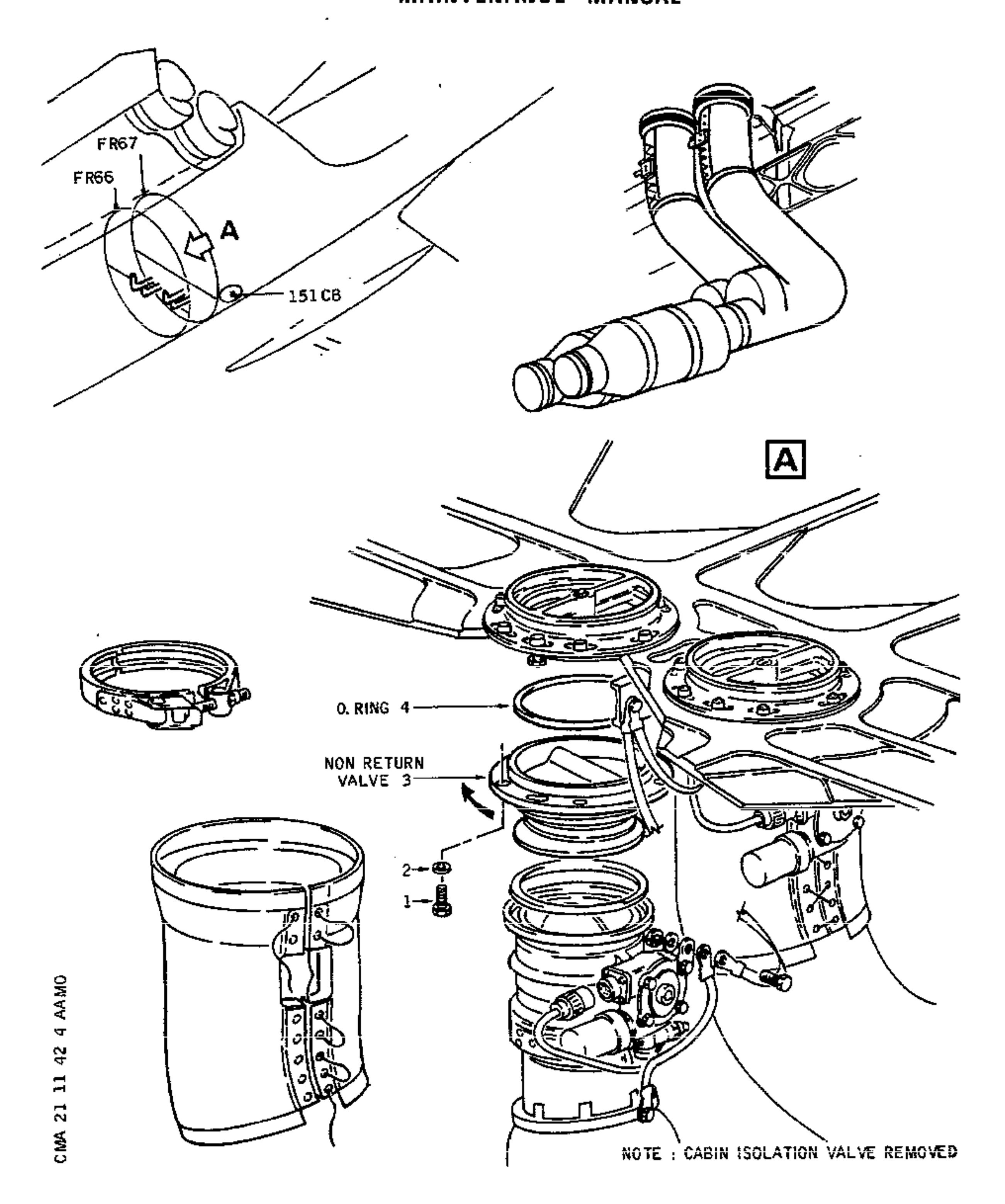
(2) Check non-return valve for evidence of dents or traces of corrosion.

(3) Make certain that both non-return valve flaps move correctly

(4) Make certain that valve flap seats correctly

E. Install

(1) Install non-return valve (3) in its mounting ; sli-ghtly turn it in order to make it possible to install



Non-Return Valve Installation
Figure 401

attachment screws

(2) Install screws (1) fitted with washers (2). Tighten screws. Torque to between 0.35 and 0.45 m.daN (26.5 and 31 lbf.in.). Wirelock screws together.

F. Close Up

(1) Install cabin isolation valve (Ref. 21-12-42, Page 401, Removal/Installation).

NON-RETURN VALVE - INSPECTION/CHECK

1. General

The inspection/check procedure is identical for the non-return valve of each group

2. Reason for the Job

To make certain that air intake non-return valves operate correctly

3. Inspection/Check

A. Remove the corresponding cabin isolation valve (Ref. 21-12-42, R/I)

B. Make certain that both non-return valve flaps operate correctly

C. Make certain that flap seats correctly

D. Check non return valve for traces of corrosion

E. Install cabin isolation valve (Ref. 21-12-42, Page 401, R/I, Page 501, A/T).

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AIR PRESSURE INDICATOR - REMOVAL/INSTALLATION

1. General

The air pressure indicator of each air conditiong group is located on AIR BLEED CONTROL panel 2-214.

The removal/installation procedure is identical for each group.

2. Air Pressure Indicator

A. Equipment and Materials

Not Applicable.

B. Prepare

(1) De-energize the aircraft electrical network, as required (Ref. 24-41-00, Servicing).

C. Remove (Ref. Fig. 401)

(1) Loosen lock screw (1) several turns.

(2) Remove pressure indicator carefully from panel and disconnect electrical connector (2) located behind it.

(3) Remove indicator.

D. Install

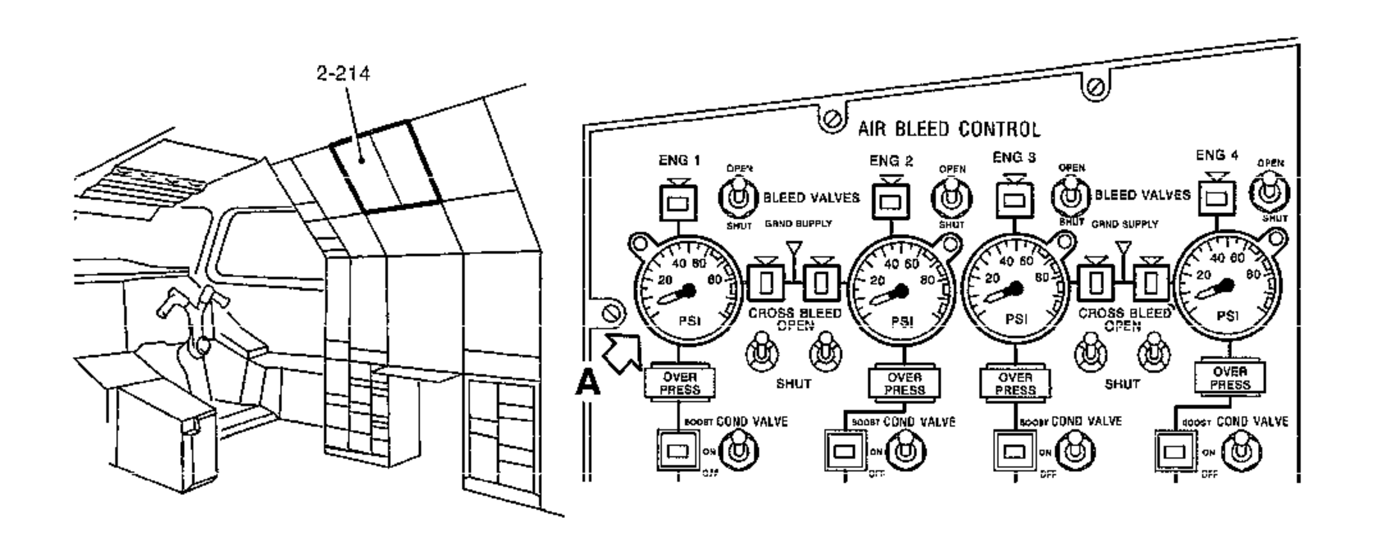
(1) Connect electrical connector (2) to indicator.

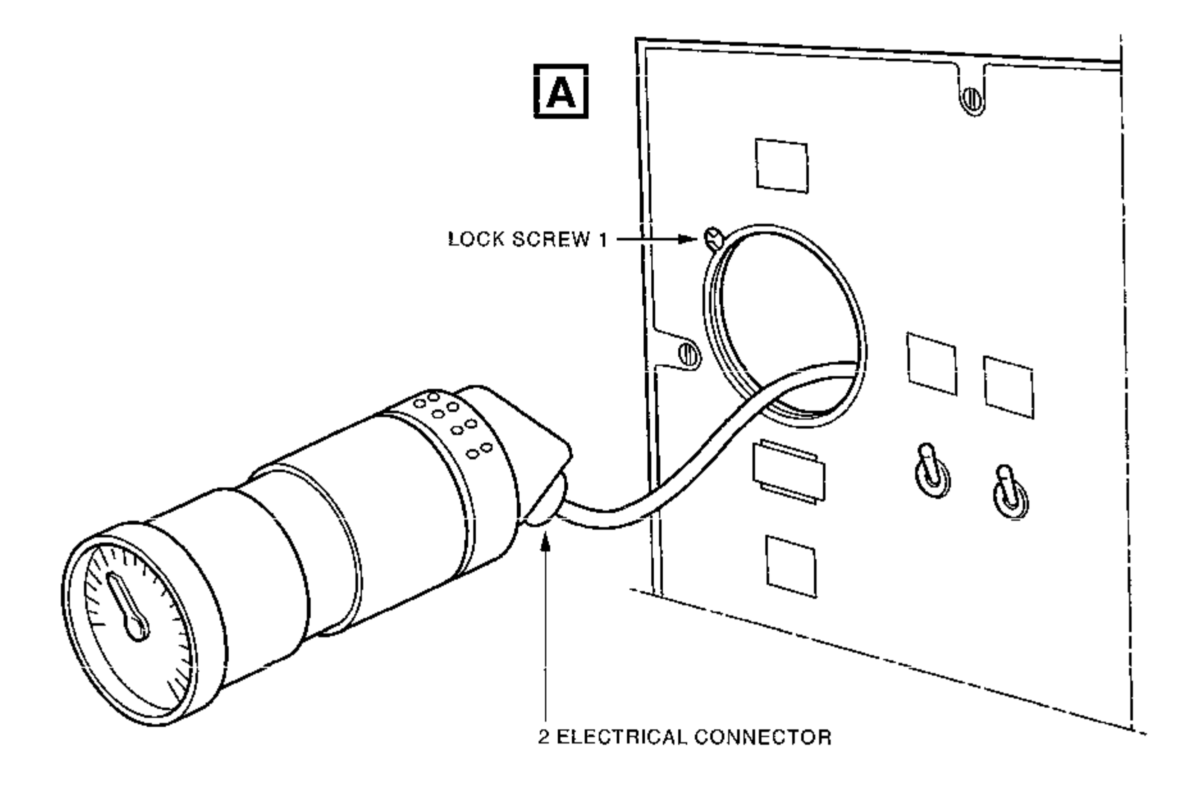
(2) Install indicator.

(3) Lock it in position by means of lock screw (1).

E. Close-Up

Not Applicable.





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Air Pressure Indicator
Figure 401

AIR PRESSURE INDICATOR - ADJUSTMENT/TEST

1. General

A. The purpose of this test is to check that air pressure indicator operates correctly.

B. The test procedure is identical for the four air pressure indicators. Only their location is different.

2. Operational Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Ground Air Supply Unit	
- Relative Minimum Pressure 2 bars Airflow : 0.4 Kg/sec - Relative Maximum Pressure 4.5 bars Airflow : 0.6 Kg/sec	
The temperature must not exceed 300°C	
Circuit Breaker Safety Clips	

B. Prepare

(1) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG1 AND 4 AIR START CONT	15-215	K 181	C15
ENG1 AND 3 AIR START CONT	15-216	K 182	D11

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(3) Connect ground air supply unit and pressurize the

aircraft.

D. On panel 2-214, place CROSSBLEED switches in OPEN position (switches 1 and 2 or 3 and 4 according to air pressure indicator to be tested).

Check on air pressure indicator 1H891 and 2H891 or 3H891 and 4H891 that the pressure values displayed are identical.

On panel 2-214, place CROSSBLEED switches in OFF position.

Shut down and disconnect ground air supply unit.

De-energize the aircraft electrical network and disconnect electrical ground power unit.

Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2B.

3. Functional Test

A. Equipment and Materials

DESCRIPTION	PART NO.
1 Electrical Ground Power Unit	
1 Decade Resistance Box	
1 Test Connector	
Circuit Breaker Safety Clip	

B. Prepare (Ref. Fig. 501)

(1) According to air pressure indicator to be tested, trip safety and tag the following circuit breaker :

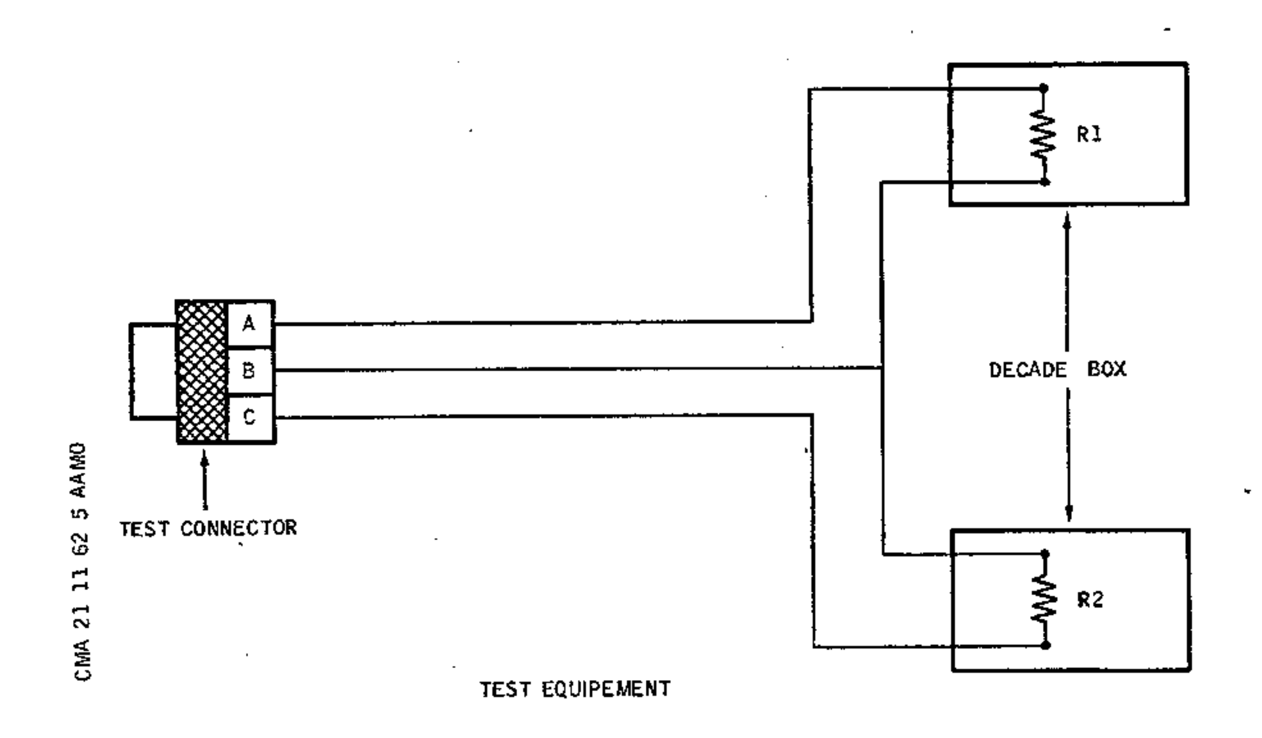
(a) For group 1 air pressure indicator

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 1 CHARGE AIR PRESS IND	13-215	1H 864	D 2

(b) For group 2 air pressure indicator

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.

**ON A/C ALL



Test Equipment
Figure 501

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 2 CHARGE AIR PRESS IND	13-216	2H 864	B20

(c) For group 3 air pressure indicator

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 3 CHARGE AIR PRESS	13-215	3H 864	F 3

(d) For group 4 air pressure indicator

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 4 CHARGE AIR PRESS	13-216	4H 864	B21

(2) Gain access to air duct pressure transmitter corresponding to air pressure indicator to be tested. (Ref. 21-11-17, Page 401, Removal/Installation).

(3) Disconnect air pressure transmitter electrical connector.

(4) Connect test connector to aircraft wiring side of air duct pressure transmitter.

(5) Set circuit breaker 1H/4H864.

(6) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

C. Test

(1) On test equipment, select resistance values : 79 ohms for R1 and 107 ohms for R2. Air pressure indicator pointer must indicate a pressure lower than 5 psi.

(2) According to table below, select resistance values for R1 and R2 with decade boxes and check that air pressure indicator pointer reads the corresponding value (indicators on panel 2-214).

SELECTED RESISTANCE (Ω)		INDICATOR READING PSI
R1	R2	
79	107	< 5
84,6	101,4	20 ± 3
90,2	95,8	40 ± 2,5
95,8	90,2	60 ± 2,5
101,4	84,6	80 ± 2,5
107	79	100 ± 3
79	107	< 5

(3) Trip circuit breaker (1H/4H864) corresponding to tested indicator.
Air pressure indicator pointer must position on lower mechanical stop.

(4) Reset circuit breaker 1H/4H864.

D. Close-Up

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit.

(2) Disconnect test connector.

(3) Reconnect air duct pressure transmitter.

(4) Close access doors to pressure transmitter (Ref. 21-11-17, Page 401, Removal/Installation).

MASS FLOW INDICATOR - REMOVAL/INSTALLATION

1. General

The mass flow indicators are located on TEMPERATURE CONTROL panel 2-214.

2. Mass Flow Indicator

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	

B. Prepare

(1) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1			
GRP1 TEMP SELECTOR AUTO SUP & CONT	2-213	H1000	B17
GRP1 FUEL VALVE CONT		1H 863	D16
Group 2			
GRP2 TEMP SELECTOR AUTO SUP & CONT	4-213	H1001	E11
GRP2 FUEL VALVE CONT		2H 863	E12
Group 3			
GRP3 TEMP SELECTOR AUTO SUP & CONT	2-213	H1002	G16
GRP3 FUEL VALVE CONT		3H 863	F16
Group 4			
GRP4 TEMP SELECTOR AUTO SUP & CONT	4-213	H1003	B12
GRP4 FUEL VALVE CONT		4H 863	B11

C. Remove (Ref. Fig. 401)

(1) Remove screw (1) in order to release mass flow indicator from its housing.

(2) Remove mass flow indicator from panel, disconnect electrical connector (2).

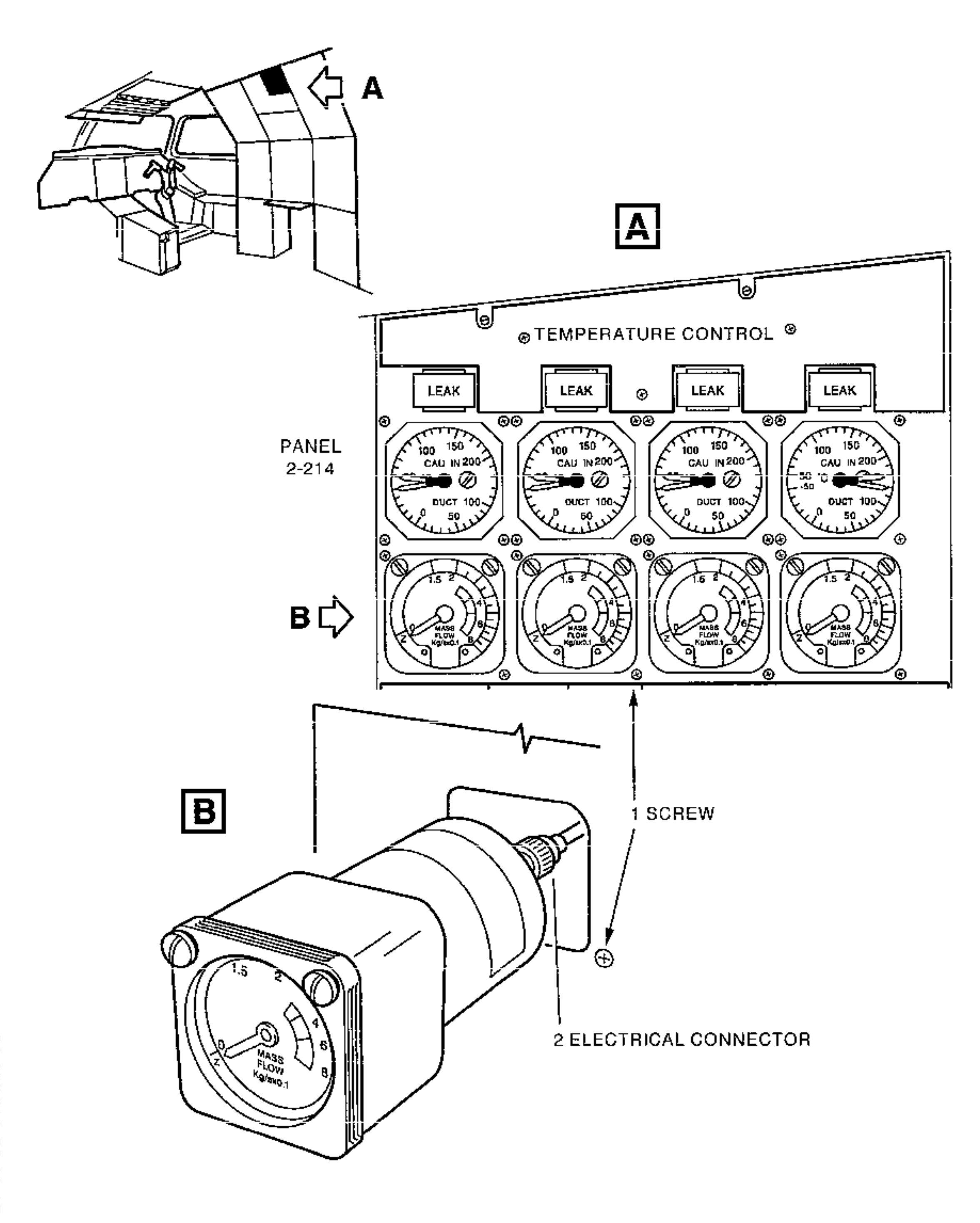
D. Install

(1) Connect electrical connector (2) to mass flow indicator, and install the latter in its housing.

(2) Secure mass flow indicator in its housing by means of screw (1).

E. Close-Up

Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2. B (1).



Mass Flow Indicator
Figure 401

TEMPERATURE LIMITING - DESCRIPTION AND OPERATION

1. General (Ref. Fig. 001)

After being limited in pressure and flow, the conditioning air passes into the primary heat exchanger. This heat exchanger limits outlet air temperature to 200°C (392°F), approximately.

The air then enters the Cold Air Unit compressor, where it is compressed to raise its temperature and thereby provide optimum cooling efficiency in both the secondary and air/fuel heat exchangers). The Cold Air Unit includes a compressor and turbine rotor mounted on the same shaft. As soon as compressed air is delivered by the system, it expands in the turbine and drives the compressor.

From the compressor, the air flows through the secondary heat exchanger. This heat exchanger limits outlet air temperature to 190°C (374°F) approximately.

The air then flows through the fuel heat exchanger, which limits outlet air temperature to 120° approximately.

The air then passes through the Cold Air Unit turbine where it expands. At the turbine outlet air temperature is - 25°C (- 13°F) approximately.

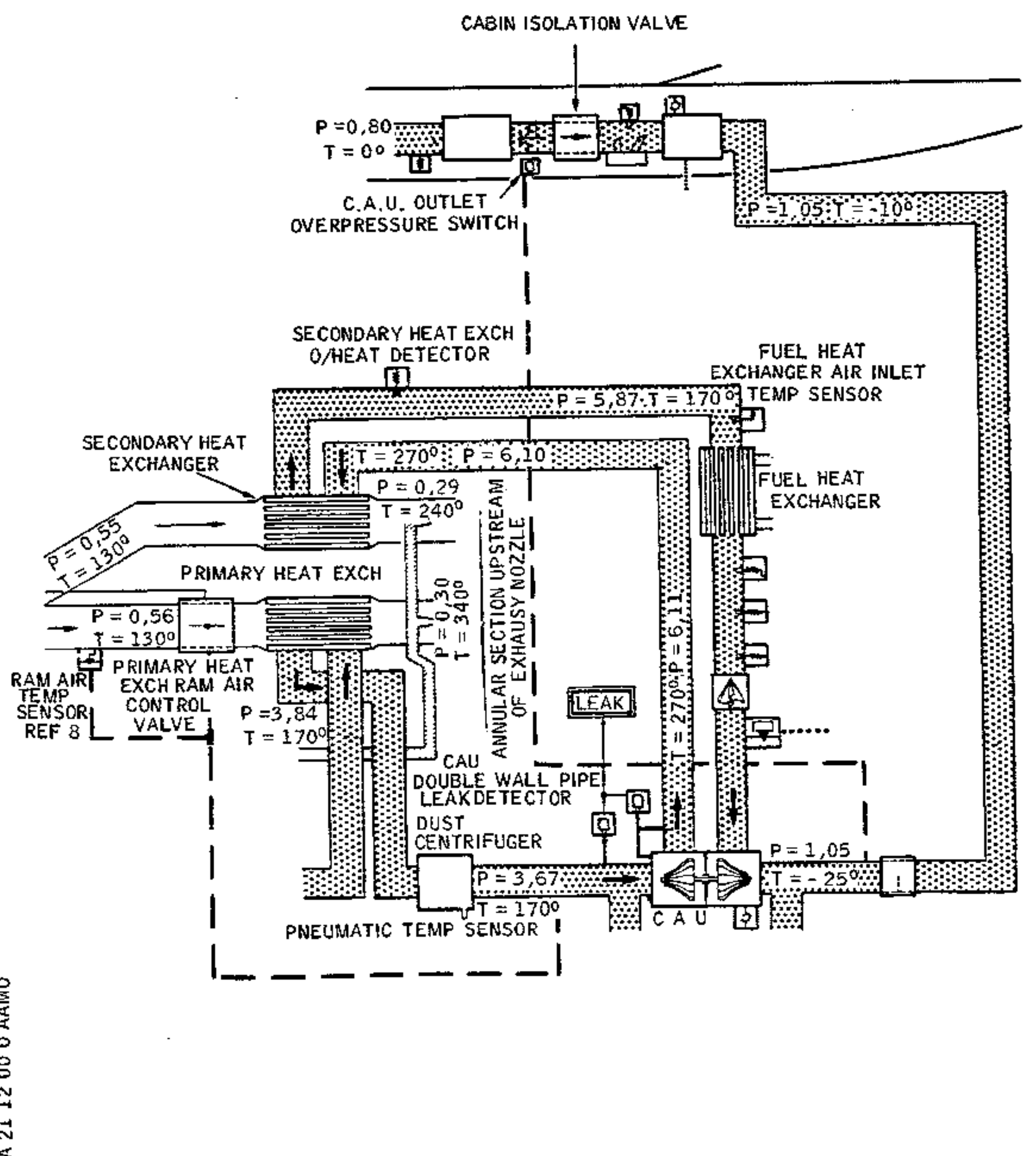
The turbine inlet consists of a variable pitch blade nozzle enabling 3 different inlet areas to be obtained :

- A small area corresponding to normal flow at cruise speed (high pressure from engine).
- An intermediate area corresponding to the mass flow control valve BOOST position.
- A large area corresponding to the maximum possible flow for a low pressure from engine.

The cabin isolation valve is mounted upstream of the distribution chamber in order to prevent the air entering the cabin if its temperature is greater than 210°C.

The compressor inlet duct and compressor housing are provided with a double wall. Two leak detectors are located in the interspaces. The main components of temperature limiting system are :

- The primary heat exchanger



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R

Temperature Limiting
Figure 001

- The secondary heat exchanger
- The fuel heat exchanger
- The cold air unit
- The cold air unit absolute pressure switch
- The cold air unit and double wall pipe leak detectors
- The cabin isolation valve
- The cabin inlet overheat thermoswitch
- The overheat safety box
- The primary heat exchanger ram air control valve

2. Primary Heat Exchanger

This is a stainless steel, compact plate and fin type exchanger, allowing two channels of charge air to cross a single channel of cooling air.

This heat exchanger is designed to limit the compressor inlet temperature to 200°C (392°F) approximately in normal operation.

3. Secondary Heat Exchanger

This is a stainless steel, compact plate and fin type exchanger, allowing two channels of charge air to cross a single channel of cooling air.

It is designed to limit the fuel heat exchanger temperature to 190° (374°F) approximately in normal operation.

4. Fuel Heat Exchanger

This heat exchanger is made of stainless steel or nickel ; it is also of the compact, plate and fin type, allowing a single channel of charge air to cross six channels of fuel.

For safety purposes this heat exchanger is provided with a double wall in order to prevent contamination of the air in the event of fuel leakage.

A draining system is installed in the double wall for ground checks.

This heat exchanger is designed to reduce the turbine inlet conditioning air temperature to its lowest possible value (efficiency 92 % approximately).

5. Cold Air Unit (Ref. Fig.002 and 003)

A. Description

The cold air unit is installed in the air conditioning system of the aircraft and, in conjunction with a seconda-

ry heat exchanger and a fuel heat exchanger, it converts by
R compression and expansion a hot air supply into a cold air
R supply. The cold air unit is adaptable for either port or
starboard application.

The general construction of the cold air unit consists essentially of a turbine rotor and impeller assembly, housed in a centre case assembly, an actuator assembly, an overspeed signal generator assembly, and an overspeed signal amplifier assembly.

Turbine rotor and impeller assembly

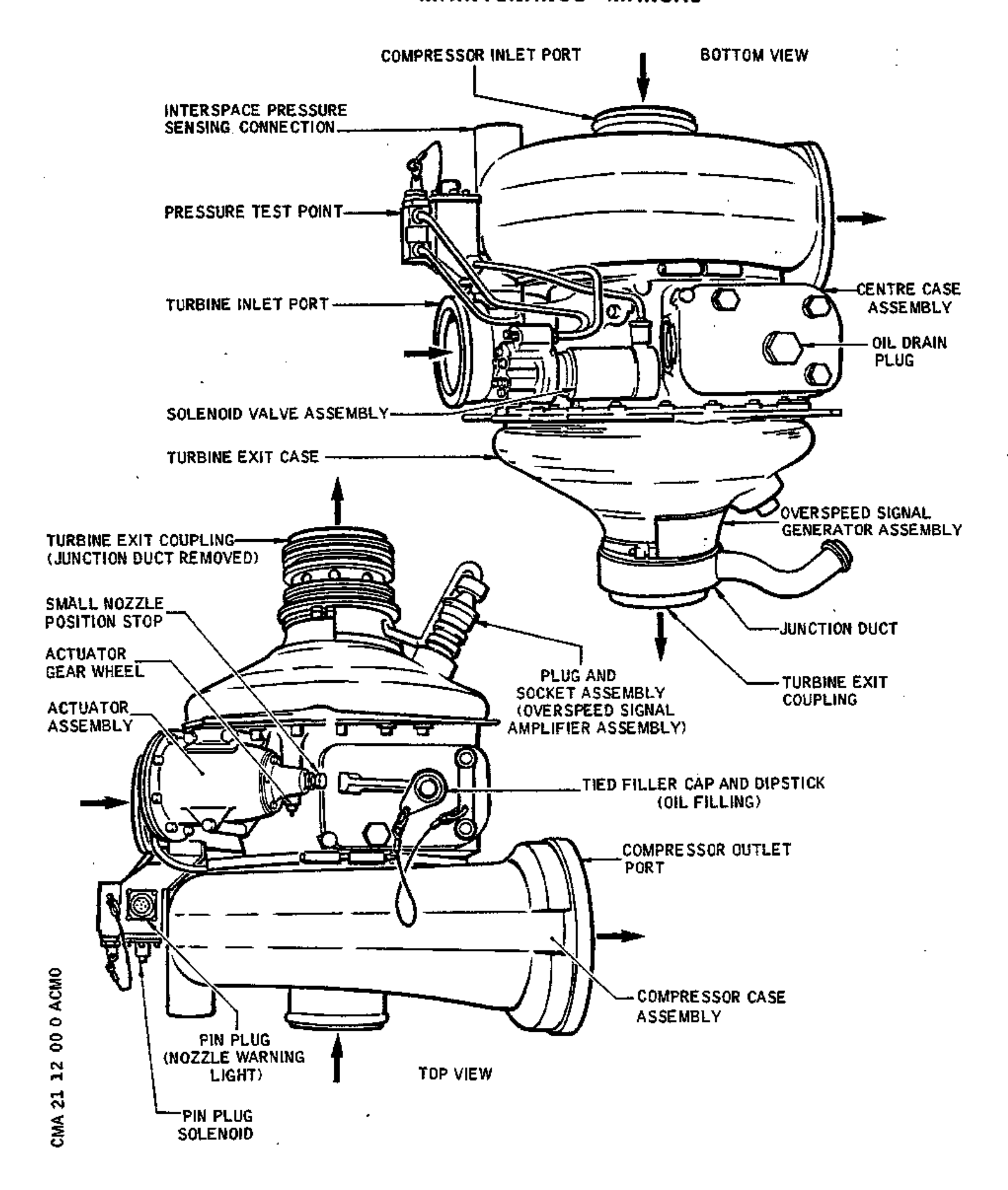
Inner races of two angular contact ball bearings are held rigidly on journals of a rotor and impeller shaft. The outer races of the bearings are locked to bearing spacers to prevent rotation, and are pre-loaded axially by the bearing spacers and a pre-load spring. The bearings, shaft and spacers are housed in a bearing housing sleeve which is fitted in the centre bore of the centre case assembly.

The rotor and impeller shaft is permitted a limited amount of end float to allow for thermal expansion, and also to
R enable bearing end loads to be accommodated without loss
of bearing pre-load.

A bearing oil impeller is fitted on the shaft behind each bearing to assist the flow of lubricating oil. To prevent a leakage of lubricating oil, which could cause contamination of the air passing through the cold air unit, a face seal and diaphragm assembly contains the oil within its lubricating system. The diaphragm assembly applies spring pressure on the face seal and causes it to seat firmly
R on the outer face of the bearing oil impeller, thus preven-
R ting any loss of oil. To ensure that correct spring
pressure is constantly applied, air pressures on the inside
R and outside of the diaphragm are kept in balance.

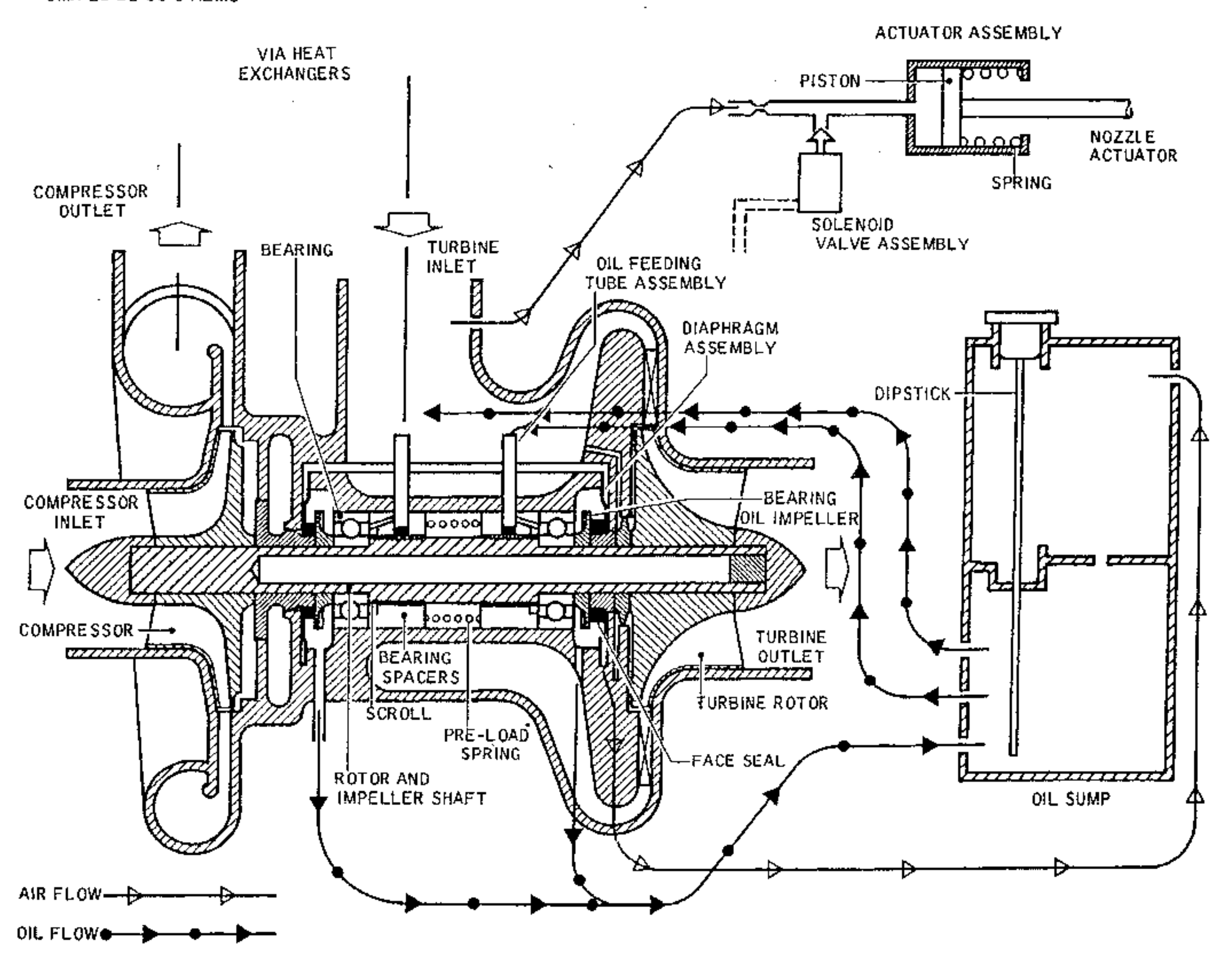
Leakages of air from the main flow passing through the inlet ports of the cold air unit are kept to a minimum by labyrinth seals formed by a combination of rotating labyrinth rings and fixed labyrinth sealing plates.

Bearing end loads are reduced to a minimum by pressure balancing. During the operation of the cold air unit, low inlet pressure is applied to the large outer labyrinth ring on the impeller end of the shaft, whilst high inlet pressure is applied to the small outer labyrinth ring on the rotor end of the shaft. A change in impeller inlet pressure results in a proportional change in turbine inlet pressure ; therefore, the end loading applied to the laby-



R

Cold Air Unit - Description
Figure 002



Cold Air Unit - Schematic
Figure 003

R

EFFECTIVITY: ALL

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rinth rings is generally equal and results in a low end loading under all conditions.

An impeller and a turbine rotor are retained to the ends of the rotor and impeller shaft, and are fitted with steel bushes which ensure that radial movement of the impeller and turbine rotor is prevented. This condition is maintained even though centrifugal forces cause the bores, in which the bushes are fitted, to expand when the cold air unit is operating at high speeds.

The bearings are lubricated by a continuous flow of lubricating oil drawn from a sump in the lower section of the centre case assembly. When the air conditioning system is started up, and immediately the cold air unit starts operating, oil in the sump is induced to flow through drillings in the castings. From these drillings the oil is transferred into two oil feeding tube assemblies which feed it to the bearings. After its passage through the bearings the oil is thrown outwards by the oil impellers and is returned to the sump via oil passages in the body of the centre case assembly. This re-circulatory method of oil lubrication ensures that a cool supply of oil is constantly fed to the bearings.

The high temperatures encountered by the cold air unit make it essential for a further cooling medium to be applied to the bearings. For this purpose, a comparatively cool flow of turbine inlet air is directed on to the section of the centre case assembly which houses the bearings, i.e., the centre bore.

Filling or topping-up of the sump is facilitated by removing a tied filler cap and dipstick, after which the oil can be poured into the sump. The level of the oil in the sump can be checked against a FULL level mark engraved on the dipstick. The position of the dipstick in the centre case can be reversed so that the cold air unit can be installed in either the port or starboard systems. A drain plug is situated on the opposite side of the centre case to that occupied by the tied filler cap and dipstick and removal of this plug, will facilitate drainage of the oil from the sump. To contain impeller inlet and outlet pressures the impeller is enclosed by an impeller case assembly which comprises a main inner case, incorporating inlet and outlet ports, and an outer case. The outer case is insulated to reduce the heat loss from the impeller case. A pressure sensing tapping and connection on the outer case is normally coupled to an external leak detector. If a rupture should occur of the inner case the subsequent rise in pressure in the interspace is sensed by the leak
R detector which causes leak yellow caption light to come on.

On assembly of the impeller case to the centre case, an insulating ring is fitted to reduce the transfer of heat from the impeller case.

Orientation of the impeller case on the centre case is different for port and starboard applications.

The centre case assembly, which has a turbine inlet port, supports a solenoid valve assembly and an actuator assembly. Servo air pressure to the solenoid and actuator assemblies is tapped off the turbine inlet flow and is fed initially to a pressure test point which, for convenience, is attached to an electrical plug support bracket. The pressure of the air passing through the test point can be monitored by removing the test point blanking plug and by inserting a suitable probe connected to a pneumatic test set. With the test point blanking plug in position, the servo air passes to the solenoid valve assembly which, dependent on the solenoid being energized or de-energized, opens or closes an air bleed to atmosphere. The solenoid is connected electrically to an external pressure switch that senses the pressure of the air tapped off the engine. When engine pressure falls below a certain level the solenoid is energized, with the result that turbine inlet servo pressure is bled to atmosphere via a pintle valve held open by a valve spring in the solenoid valve body. When engine pressure rises above the level the solenoid is de-energized causing a plunger mechanism to move the pintle valve to the closed position. The servo air, therefore, is permitted to flow through the solenoid valve body to the actuator assembly.

Actuator assembly

The servo air enters the actuator assembly, via an inlet connection in the cover, and pressurizes a chamber formed by the cover and a rolling diaphragm. As the diaphragm folds out it carries a piston head which forces a piston to travel downwards. A main spring returns the piston to its former position when the chamber is de-pressurized.

Gear teeth, machined on the piston rod, mesh with a gearwheel that is set on the outside of the centre case. The gearwheel, in turn, is linked by a shaft to a pinion gear that engages gear teeth formed on the back face of a nozzle mounting plate.

The nozzle mounting plate is supported by a mounting flange and is located in an annulus formed at the turbine rotor end of the centre case assembly. The plate consists basically of a large ball race which has its inner race

secured to the annulus by special studs. The studs also act as pivots for a number of nozzle blades which, by their slots, are located on pins equispaced around the front face of the outer race. The back face of the outer race carries the gear teeth which meshes with the pinion gear of the actuator gearing. Rotation of the outer race by the gearing causes the pins to exercise a cam movement in the slots of the blades which alters the blade angle so that the cold air unit can operate more effectively with high or low engine bleed pressures. The degree of rotation of the outer race is governed by adjustable stops on the end of the piston rod.

The special studs, mentioned previously, also retain a rotor shroud which encloses the turbine rotor to assist the air flow through the unit.

A turbine exit case carries a turbine exit coupling. Attached to this is a junction duct which carries a bleed of hot air from the temperature control valve to mix with the cold air from the CAU when the temperature control function is required. The coupling forms the turbine outlet port, whilst the case completely encloses the nozzle mounting plate, nozzle plate, nozzle blades, rotor shroud, and turbine rotor.

B. Operation

Charge air from the primary heat exchanger enters the cold air unit, via the impeller inlet port, and is compressed to a higher pressure by the rotating impeller blades. The compressed charge air passes from the cold air unit, via the impeller outlet port, and is pre-cooled by a secondary heat exchanger and then by a fuel heat exchanger. The pre-cooled charge air returns to the cold air unit, via the turbine inlet port, and is directed through the nozzle blades on to the blades of the turbine rotor. Passing through the rotating turbine rotor blades the pre-cooled compressed charge air expands and gives up a considerable amount of its remaining heat as energy to drive the turbine rotor and the impeller. The heat extracted charge air, therefore leaves the turbine outlet port of the cold air unit as cold air.

R The nozzle blades of the cold air unit can be selected to
R assume one of the three positions :-

R (1) At low inlet pressures, the blades become large area
R nozzles to allow maximum flow at the turbine assembly.

R (2) At high inlet pressures (normal operation), the blades

R become small area nozzles, to restrict the flow at the
R turbine assembly.

R (3) The cold air unit is designed for use with parallel air
R conditioning systems. Should one of the systems be shut
R down for any reason, an intermediate "BOOST" position
R can be selected on the remaining cold air units to in-
R crease the air flow, thus restoring a proportion of the
R air conditioning air flow which has been lost.

6. Primary Heat Exchanger Ram Air Control Valve

A. Description (Ref. Fig. 004)

The ram air control valve is installed in the air conditioning system of an aircraft and, in conjunction with other items of equipment, operates to regulate the flow of ram air through a heat exchanger in order to maintain the required charge air temperature downstream of the heat exchanger.

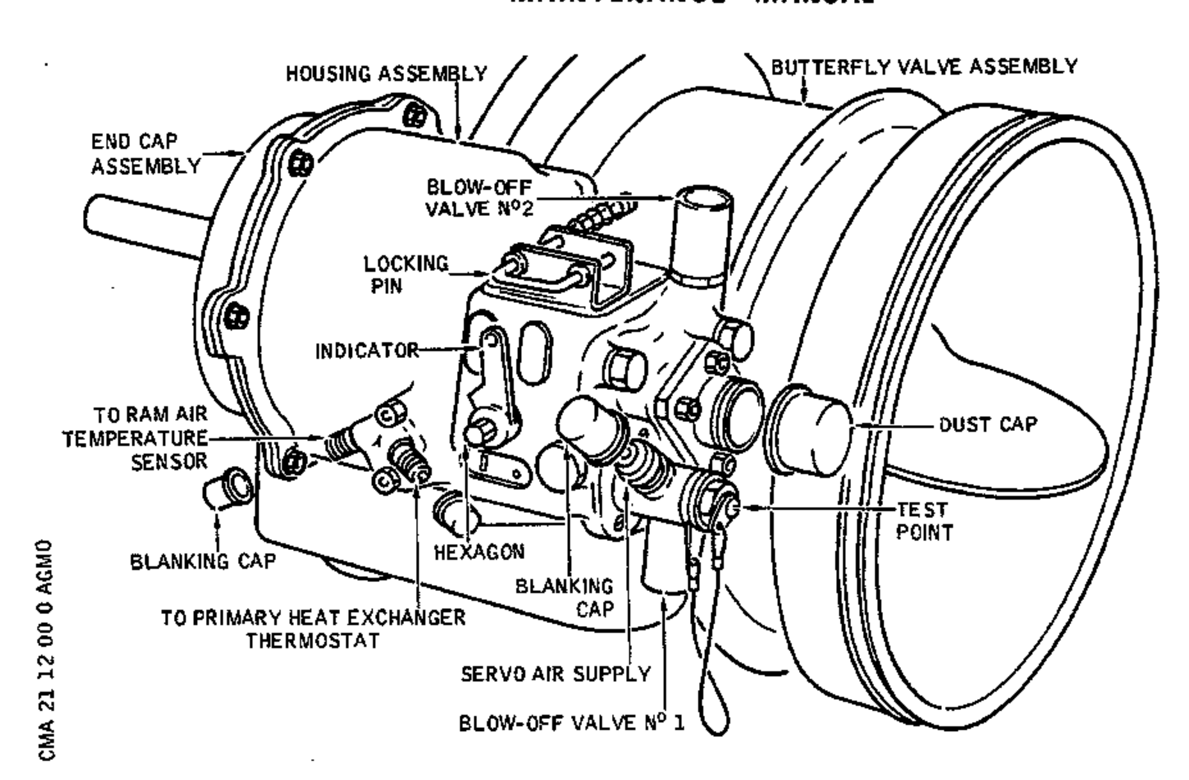
The ram air control valve consists essentially of a butterfly valve assembly and a controlling mechanism which uses servo pressure to control the position of the butterfly.

The controlling mechanism includes a spring-loaded "rolling-type" diaphragm that is coupled to the butterfly valve shaft by linkage, and a beam with an attached half-ball valve. The beam pivots under the influence of servo pressure reacting in a bellows unit. A cam and spring comprise a feed-back arrangement to aid stability. A balance spring and adjuster are used for the initial setting of the controlling mechanism. The linkage between the diaphragm and the butterfly carries a cam which operates a micro-switch which transmits a signal when the butterfly moves from the open position. Additionally, an indicator rotates with the butterfly valve shaft to enable the position of the butterfly to be checked visually.

If the control valve fails with the butterfly in the closed position a spanner can be used on a hexagon at the end of the butterfly valve shaft to turn the butterfly to the open position.

The butterfly can then be locked in this open position by a spring-loaded locking pin.

A test point adjacent to the servo air inlet can be used, in conjunction with a test probe, to determine pressures during testing.



Primary Heat Exchanger Ram Air
Control Valve - Description
Figure 004

B. Operation (Ref. Fig. 005)

Normally, the butterfly is in the fully open position, thus allowing full ram air flow to pass through the heat exchanger.

Servo air, which is tapped from the charge air ducting downstream of the heat exchanger, enters the ram air control valve at the servo inlet connection, passes through a filter, and is controlled at a pre-determined pressure by two blow-off valves in series. It then branches to the diaphragm chamber and to the pressure sensing bellows unit.

Control of servo pressure in the diaphragm is dependent upon the amount of lift of the half-ball valve which, in turn is dependent upon the servo pressure in the bellows unit.

If the temperature of the ram air sensed by a ram air
R temperature sensor falls below 25°C and if the temperature

of the charge air sensed by a heat exchanger outlet temperature sensor is below 100°C, it becomes necessary to restrict ram air flow through the heat exchanger to maintain charge air temperature between 80°C and 100°C.

Under these conditions a servo bleed in the ram air temperature sensor is closed, and a servo bleed in the heat exchanger outlet temperature sensor is starting to close (to be completely closed at 80°C). Consequently the following actions occur - the bellows pressure rises, the beam pivots, the half-ball valve starts to close, the pressure in the diaphragm chamber, through the mechanical linkage, starts closing the butterfly and so reduces the ram air flow through the heat exchanger.

However, if ram air inlet temperature rises above 25°C, the ram air inlet sensor bleed opens, the bellows pressure falls, the half-ball valve opens, pressure in the diaphragm chamber falls, and the butterfly moves to the open position, assisted by the diaphragm springs.

Similarly, if the heat exchanger charge air outlet temperature rises above 100°C the heat exchanger outlet temperature sensor servo bleed opens, and the butterfly moves to the open position.

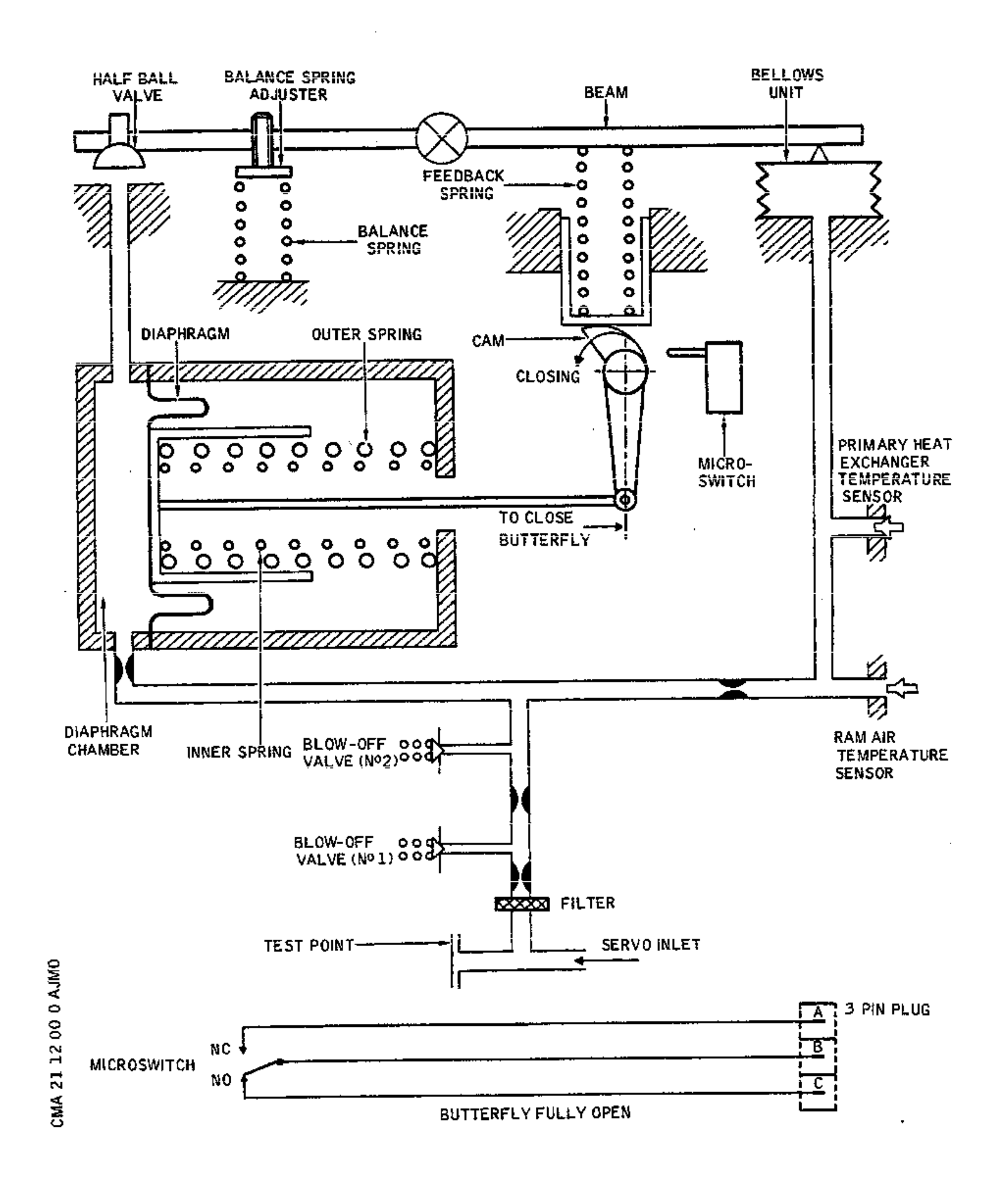
In response to slight changes of charge air temperature at the heat exchanger outlet, the ram air control valve modulates to maintain charge air temperature between the required limits.
The feed-back arrangement exerts a stabilizing influence on the beam in the following manner :

When the butterfly is closing, the pressure applied by the cam is reduced, and the reduced feed-back spring tension relieves pressure on the beam, with the result that the force applied by the bellows unit on the beam to close the half-ball valve is opposed. Conversely, when the butterfly is opening, the pressure applied by the cam is increased, with the result that movement of the beam to open the half-ball valve is opposed.

7. Overheat Safety System Control System (Ref. Fig.006 and 007)

For each group, the temperature safety is provided by an overheat safety box associated with overheat detectors.

The overheat safety box transmits a closing signal to the air conditioning valve and mass flow control valve if an overheat condition is detected in primary and secondary heat exchangers ; in the event of conditioning air overheat or turbine inlet



Primary Heat Exchanger Ram Air
Control Valve - Schematic
Figure 005

excessive temperature.

These overheat detections are indicated on AIR BLEED CONTROL panel. PRIM EXCH, SEC EXCH and DUCT warning lights come on. AIR warning light on Master warning panel also comes on ; the single stroke gong sounds.
A fuel heat exchanger overheat detection causes the FUEL EXCH warning light to come on and transmits an opening signal to the fuel control valve.
The system is tested by means of an AIR COND TEST switch which supplies power to the AIR COND TEST rotary test switch. Both are located on panel 23-214).
It is possible to test the overheat detection system by positioning rotary test switch in PRIM - SEC - FUEL - DUCT 1 - DUCT 2 positions ; it energizes test relay of corresponding printed circuit board and causes the corresponding warning lights to come on without shutting down the group.
For each group when rotary test switch is placed in COND position, air conditioning and mass flow control valves close ; when rotary test switch is placed in FLOW position, only mass flow control valve closes. The valves close only if the air conditioning group operates.

A. Each overheat detection system consists of :

(1) Five detectors

(2) A control unit

(3) The overheat safety box consists of :

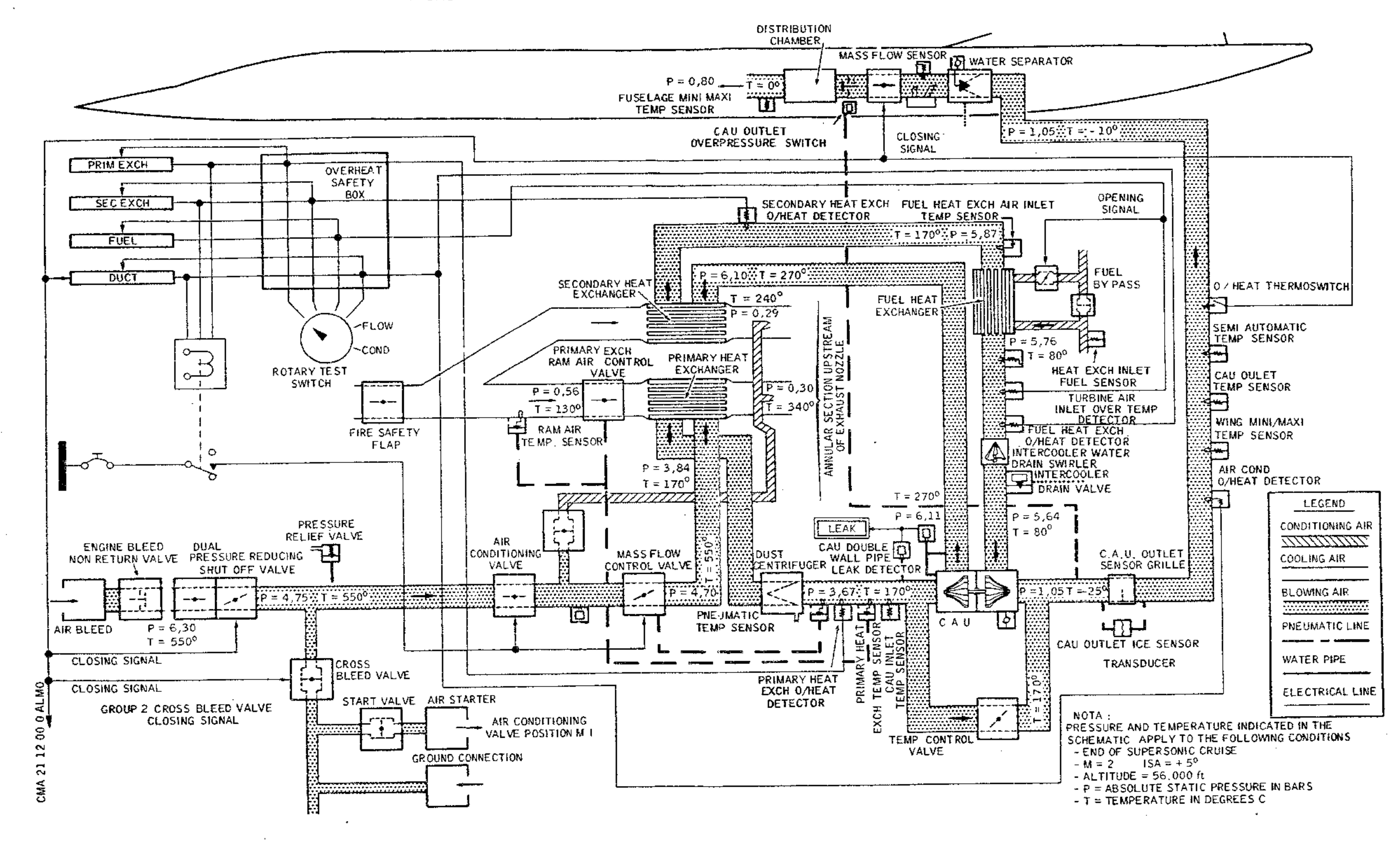
- A transformer
= Two supply printed circuit boards
- A 210°C (410°F) printed circuit board
- A 220°C (428°F) printed circuit board
- Two 120°C (248°F) printed circuit boards
- A 95°C (203°F) printed circuit board
- A filtering printed circuit board

Function :

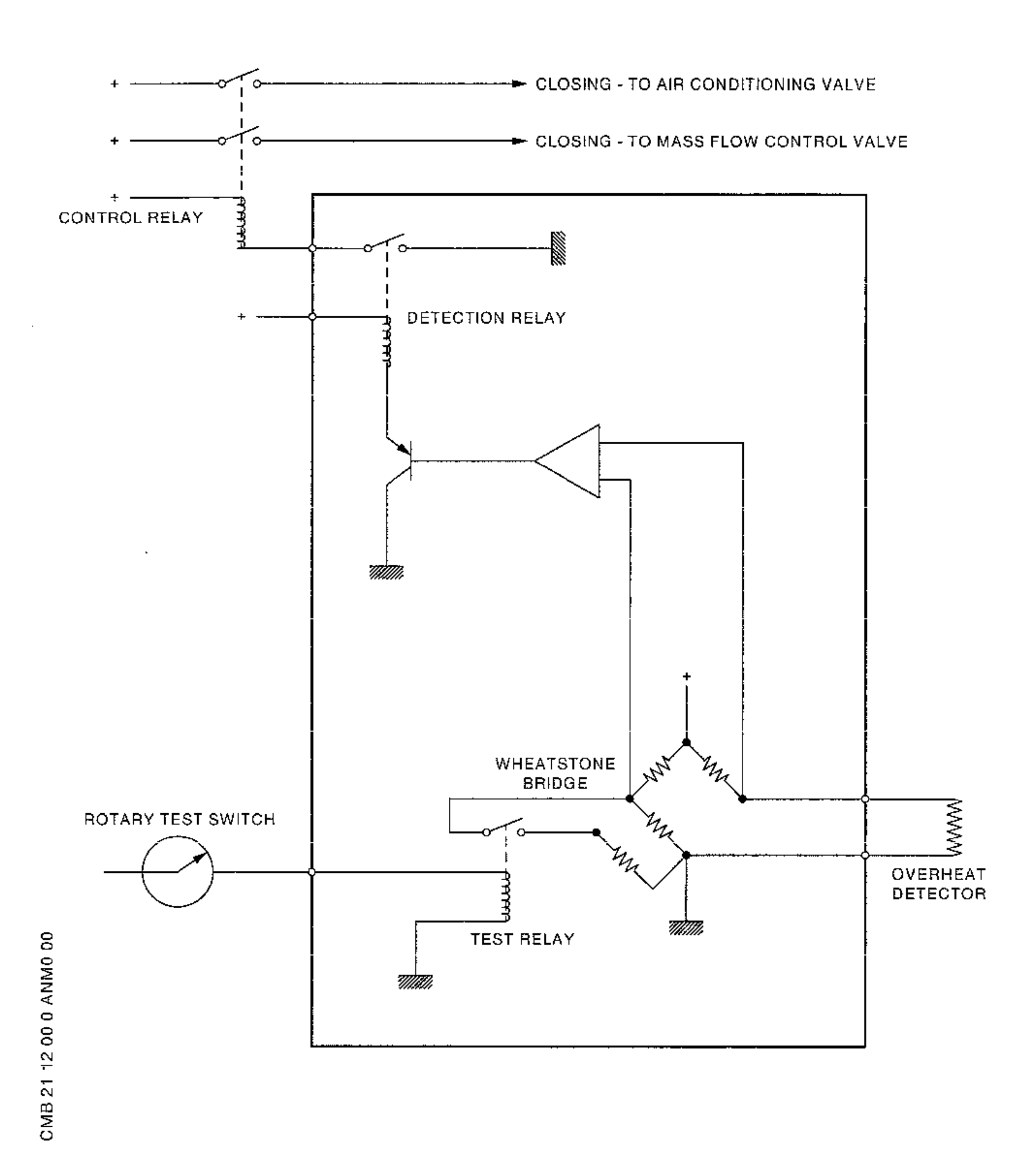
When the detected temperature value reaches the selected value, the control component transmits an electrical signal in order to provide automatically :

- The overheat warning
- The safety control

The location of overheat detection points is given in table below :



Overheat Safety Box - Operation
Figure 006



Overheat Detection - Schematic
Figure 007

overheat detector Name	overheat detector Location
Primary heat exchanger overheat detector (220°C)	Immediately downstream of mixing point primary heat exchanger
Secondary heat exchanger overheat detector (210°C)	Immediately downstream of secondary heat exchanger
Fuel heat exchanger overheat detector (120°C)	Immediately downstream of fuel heat exchanger
Air conditioning overheat detector (120°C)	Immediately downstream of by pass system and cold air unit outlet mixing point
Turbine air inlet over temperature detector	Immediately downstream of fuel heat exchanger

B. Normal Operation

The detection printed circuit board consists of:

(1) A Wheatstone bridge

The overheat detector is one branch of the bridge. The other branches are made by resistors R2, R3, R4, R8 and potentiometer P1.
The detector resistance varies with the temperature and the bridge is balanced when the overheat threshold is obtained.
RT being the sensor resistance value for $\theta = \theta T$ (Overheat signal triggered).

For $\theta < \theta T$	$R < RT$	$VA-VB > 0$ (no warning)
$\theta = \theta T$	$R = RT$	$VA-VB = 0$ (warning)
$\theta > \theta T$	$R > RT$	$VA-VB < 0$ (warning)

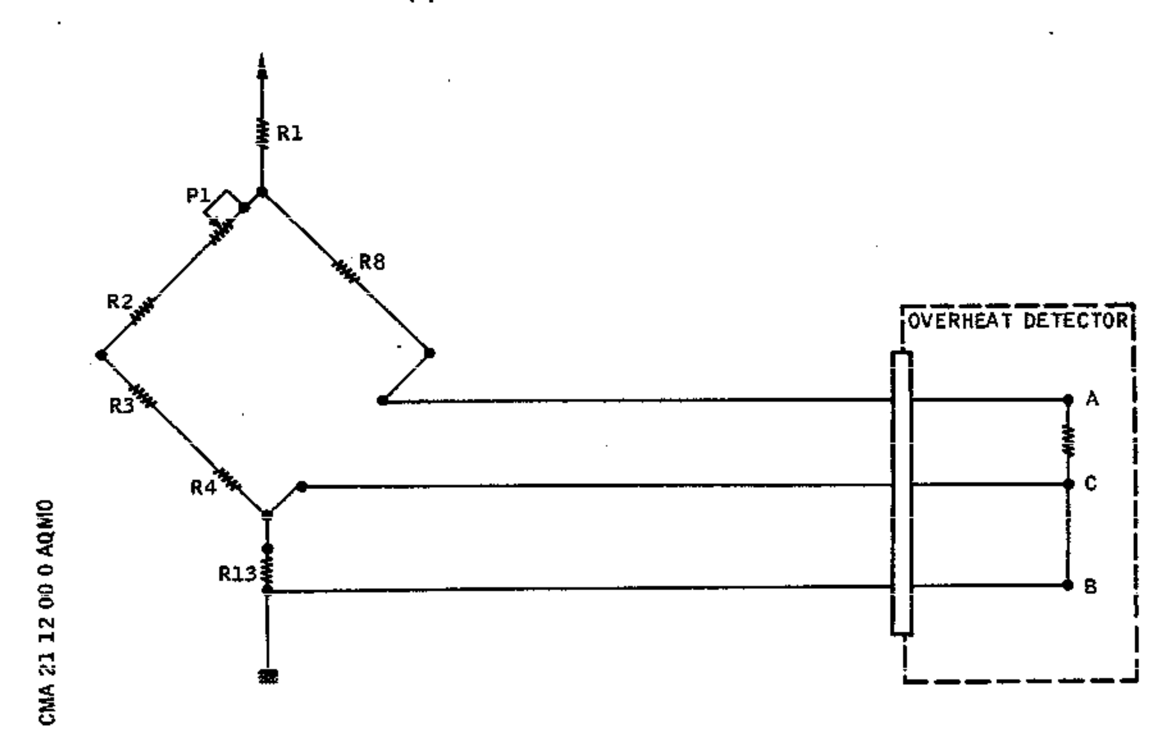
(2) Amplifier (Ref. Fig. 008 and 009)

It is an operational integrated amplifier (IC1) mounted in an open loop in order to open or close the circuit as rapidly as possible.
This amplifier controls the base of a transistor having the warning relay coil in the collector circuit.

(a) When $\theta < \theta T$ amplifier IC1 is in a positive saturation state, transistor Q1 is saturated and relay K3 is energized, there is no warning.

When θ = θT the transistor is no longer conductor, the relay is not energized and warning is triggered.

When θ > θT, amplifier IC1 is in a negative saturation state, transistor Q1 is not a conductor and relay K3 is not energized, the warning appears.



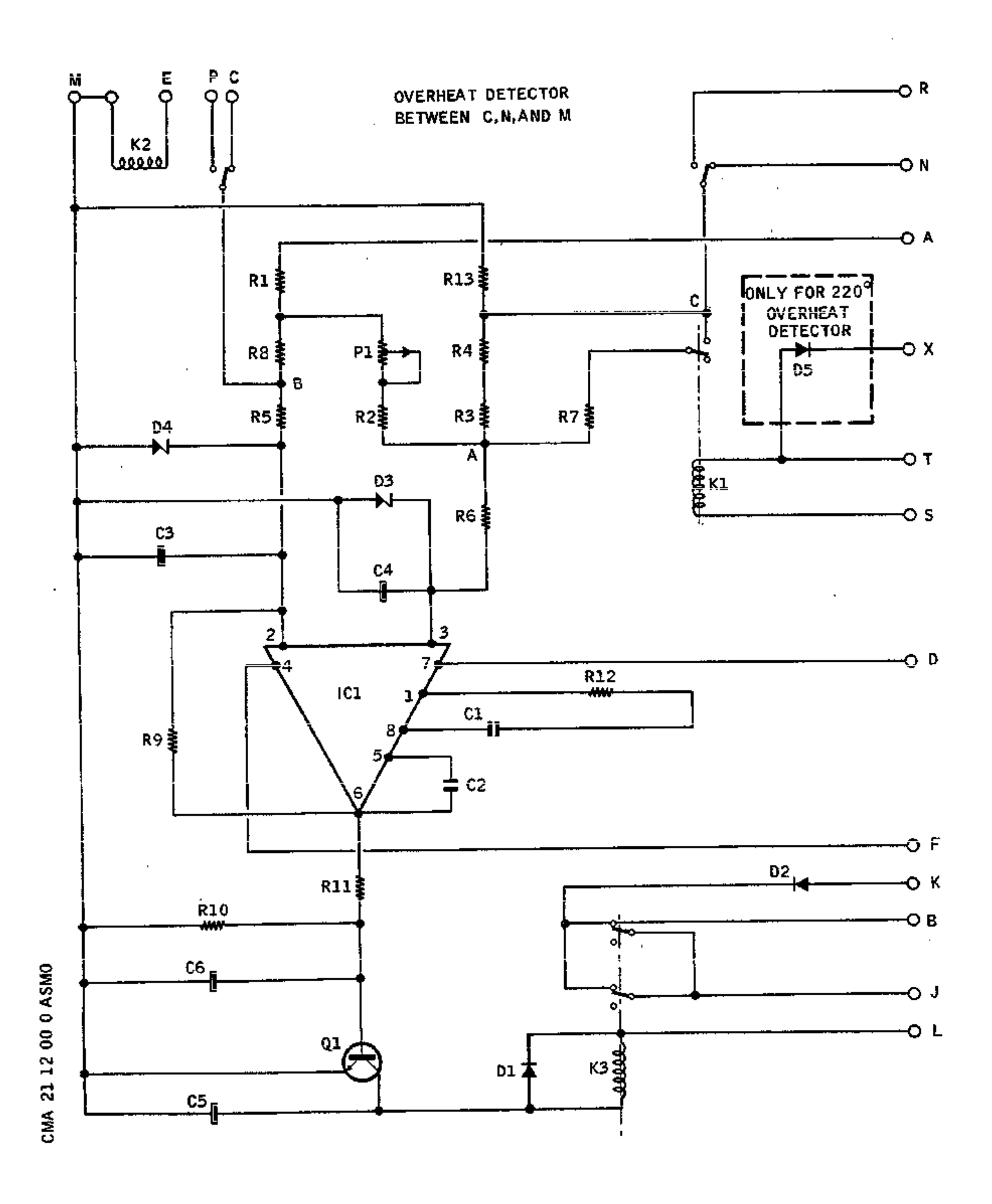
Detection Function Synoptic
Figure 008

(b) Test Operation

Relay K1 control enables testing of the electronic system.

When relay K1 is energized, a resistor R7 is in parallel with the bridge branch R3, R4.

Whatever the resistance value (for a temperature greater than 70°C (158°F), voltage VA = VB is negative, amplifier IC1 is in a negative saturation state, Q1 transistor is no longer a



Printed Circuit Board Schematic
Figure 009

R

conductor, relay K3 is not energized and warning appears.

(c) Overheat Detector K2 Relay

In rest position, the detector is disconnected in one of the branches of the Wheastone bridge.

If relay K2 is energized, B and C points are connected to the test connector located on the front of the unit which makes it possible to adjust the triggering threshold by simulating the platinium resistor on test connector.

(d) Overheat Detector (Ref. Fig. 010)

The overheat detector is connected by 3 wires in order to reduce the resistance effect of the electric line.

The overheat detector platinium resistor is directly subjected to the temperature of conditioning air flowing through the duct. The temperature variation causes the resistance value to vary and consequently the current intensity to the control element changes.

When the detected temperature reaches the warning value, the control element transmits an electrical signal in order to automatically ensure :

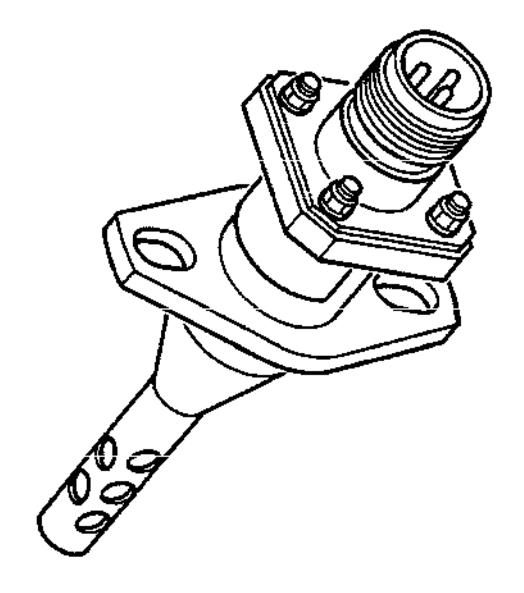
RB - The overheat warning
- The safety control

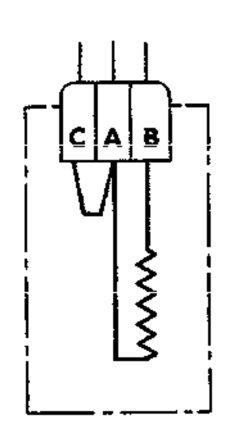
Warning temperatures

- Primary heat exchanger : 220°C (428°F)
- Secondary heat exchanger : 210°C (410°F)
- Fuel Heat exchanger : 120°C (248°F)
RB - Turbine Inlet : 95°C (203°F)
- Conditioning Air : 120°C (248°F)

8. Cabin Inlet Overheat Safety

A. The purpose of the cabin isolation valve is to blank off the duct upstream of the distribution chambers in the event of turbine break.
If this occurs, hot gases may appear in the wing and penetrate in the cabin if the air conditioning ducts are burst
This safety device consists of :





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Overheat Detector
Figure 010

- An overheat detector located on the duct in the wing. The triggering threshold is 210° ; the detector is of the thermoswitch type (this thermoswitch cannot be tested in situ)
- A butterfly electric valve, supplied with direct current (provided with a double winding motor)
- The indicating and control circuit

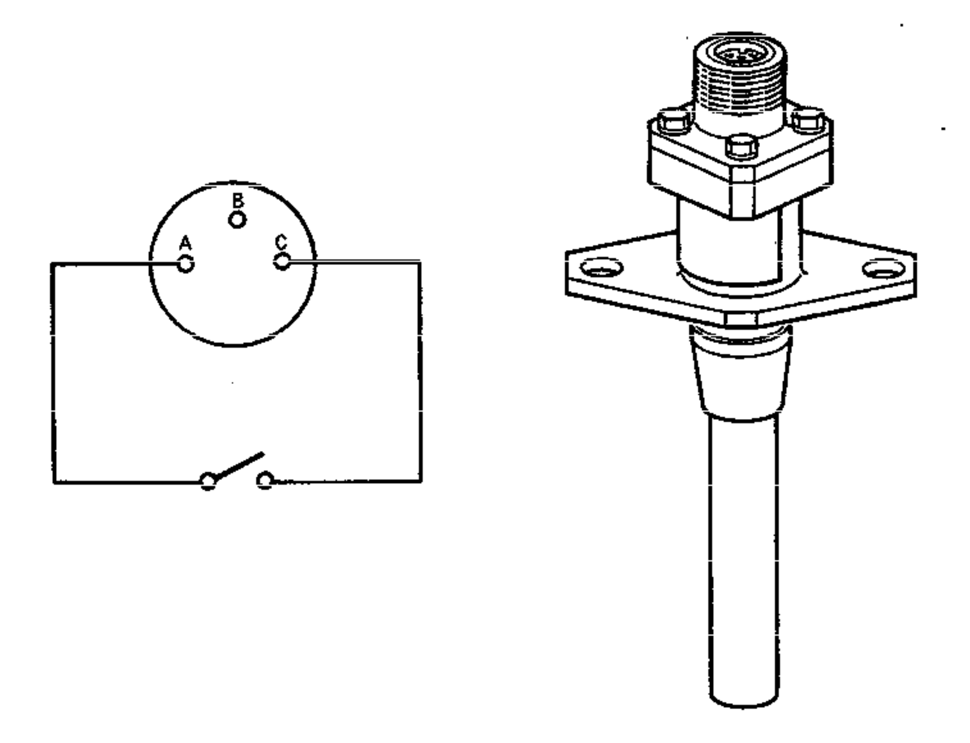
B. Cabin Inlet Overheat Thermoswitch (Ref. Fig. 011)

Purpose

The overheat thermal switch located adjacent to the cabin access door is designed to sense the temperature value of the conditioning air flowing in the lines downstream of the cold air unit.

Principle

The operation of the system is based upon the difference between the expansion factors of two main consituant metals



Cabin Inlet Overheat Thermoswitch
Figure 011

of the component.

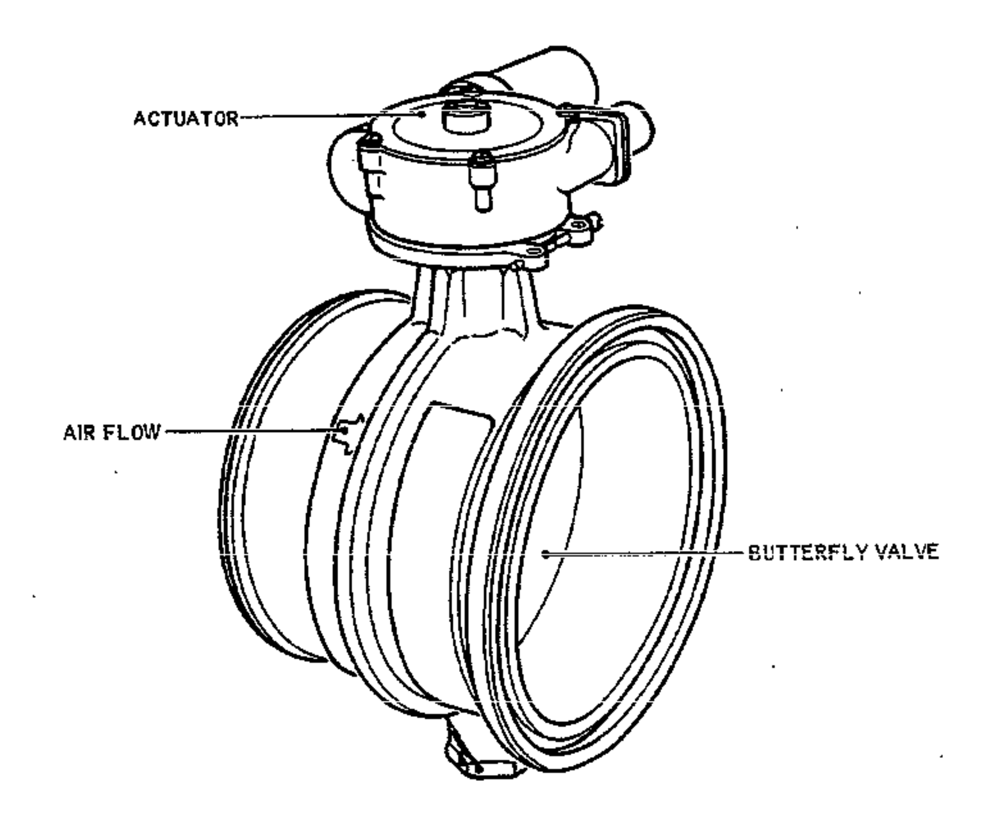
Detailed operation

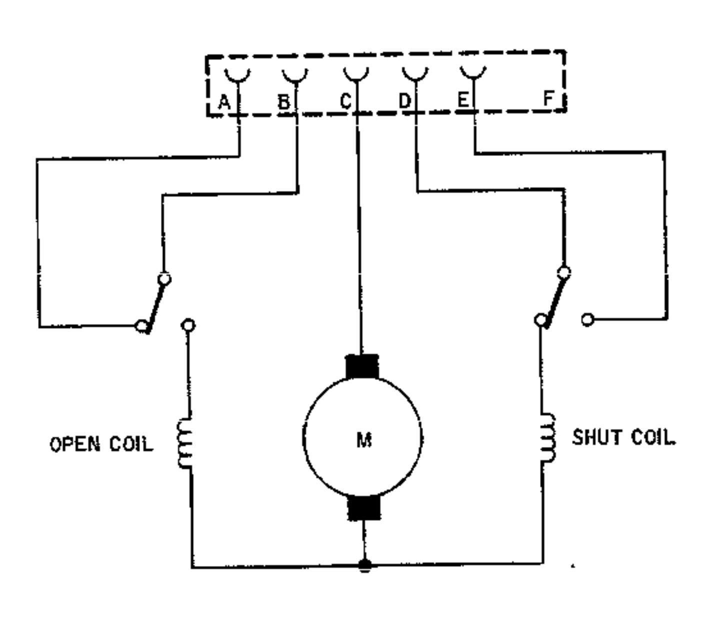
The excessive air temperature increase causes an expansion of the plunger casing. Due to its special arrangement inside the casing, the blade holder amplifies this expansion. When the ambient temperature value reaches the pre-set value (cut-in threshold of the system), the contact is made between the two blades.
The 28 V voltage available on terminal A of the connector is supplied to terminal C.

C. Cabin Isolation Valve (Ref. Fig. 012)

Description of Equipment

The unit consists of a cylindrical light alloy valve body with a beaded connection at one end and a vee type flange connection at the other, housing a light alloy butterfly. The axis of the valve body and the butterfly spindle are at right angles to each other, the steel butterfly spindle





CMA 21 12 00 0 AYMO

R

Cabin Isolation Valve
Figure 012

running in carbon bushes located in bosses in the valve body casting. The butterfly spindle is pinned to the butterfly plate to ensure positive drive. Movement of the butterfly is 90 deg from fully open to fully shut.

One end of the butterfly spindle is connected to a motor and gearbox assembly which is mounted on a vee flange machined on the valve body and clamped to it.

Position indication microswitches are incorporated in the actuator/gearbox assembly. These microswitches are used in the cabin inlet excessive temperature control system. Visual position indication is also provided by a mechanical 'see-feel' indicator mounted in top of the Actuator/Gearbox assembly.

The actuator is a 28 VDC split field motor which is selected to operate by moving the ganged switch to the 'open' position.

This connects the electrical supply to the 'open' field winding and the motor begins to run as a series machine producing a high starting torque. After actuator movement has commenced the 'shut' microswitch changes over and the 'shut' field winding is connected. The motor then runs as a compound machine which effectively slows it to give a transit time of not less than 3 secs for the 90 deg movement of butterfly valve.

A mechanical brake controls over-run at the end of an actuator transit and 2 solid stops are built into the gearbox to limit actuator movement in the event of microswitch failure.

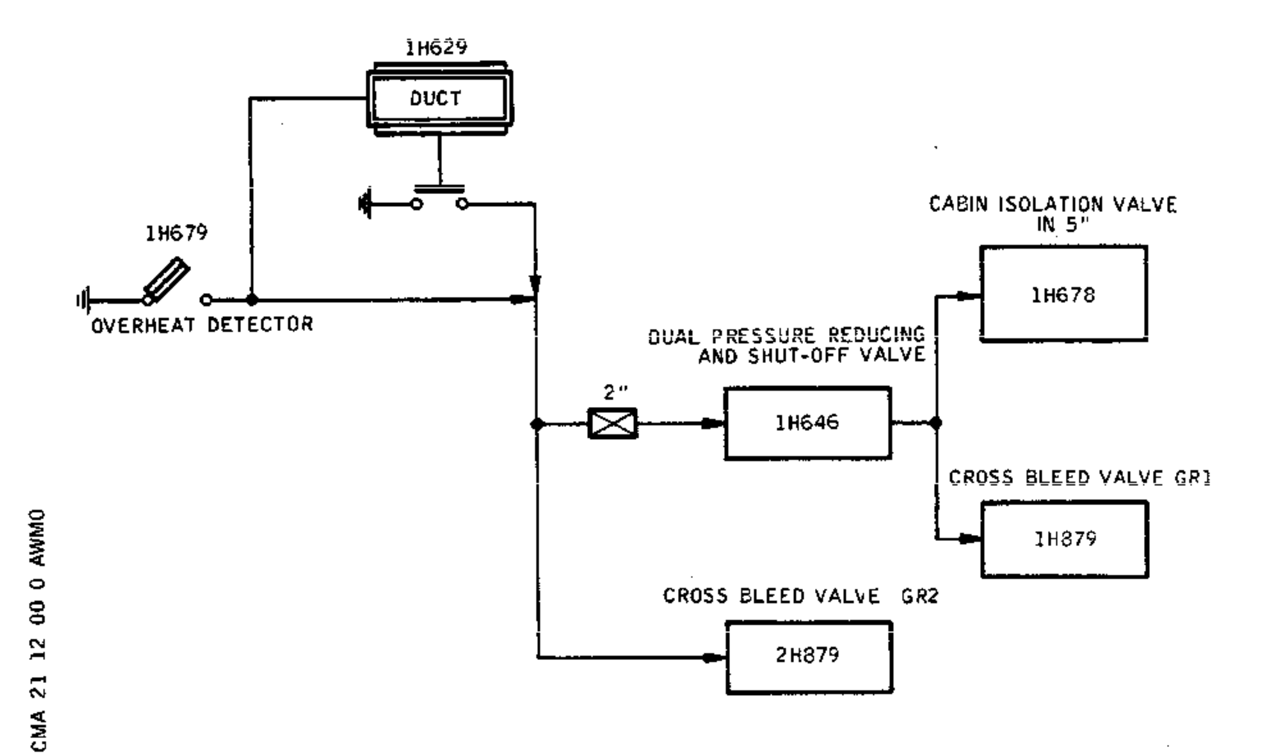
D. Indicating and control circuit
(Ref. Fig. 013)

(1) Warning operation

If the wing duct air temperature reaches 210 deg C over-heat thermoswitch 1H679 closes. DUCT warning light comes on, 2 seconds later. AIR warning light comes on on master warning panel, the single stroke gong sounds.
At this time the warning is memorized.

- If it was operating, Group 2 cross bleed valve closes with a delay of 2 seconds
- The dual pressure reducing shut off valve closes with a delay of 2 seconds
- If a group 1 cross bleed valve was operating, it closes

The cabin isolation valve closes (with a delay of 4 seconds approximately)



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Block Diagram of Cabin Inlet Overheat Detection Function
Figure 013

In this configuration :

- CROSS BLEED switch is de-activated
- BLEED VALVE switch is de-activated
- If the overheat condition disappears the warning remains on.

(2) Warning cancellation
The warning is cancelled by pressing the DUCT warning light or pulling the emergency shut down handle

(a) Pressing of DUCT warning light
The warning is cancelled by pressing the DUCT warning light several seconds. When released, the warning light does not go off immediately, even if the overheat has disappeared ; DUCT warning light goes off only when the cabin isolation valve is completely open (lapse of 4 seconds approximately) On master warning panel, the AIR warning light goes off immediately, after releasing the DUCT warning light, if the overheat condition has di-

sappeared, It is not recommended to open the cabin isolation valve if the turbine has heen broken.

(b) Pulling of emergency shut down handle. If the emergency shut down handle is pulled, the DUCT and AIR warning lights go off ; however, the cross bleed valve, the dual pressure reducing shut off valve, the cabin isolation valve remain closed. If the overheat disappears during pulling of emergency shut down handle, the position of the valves remains the same. If at this time the engine shut down handle is pushed back, the cabin isolation valve opens ; the dual pressure reducing shut off valve, the cross bleed valves are controlled open.

NOTE : If during this lapse of time the emergency shut down handle is pulled, nothing happens if the DUCT warning light is pressed. It does not come on ; the AIR warning light is not emergized on master warning panel and the valves remain in their position.

E. Operation of logic Relay (in the event of warning) (Ref. Fig. 014)

(1) The overheat condition causes contact of relay 1H679 to close ; relays 1H618 and 1H707 are energized and warning light 1H629 comes on ; relay 1H707 causes group 2 cross bleed valve to close and short-circuits BLEED VALVE switch 1H613.
After a lapse of 2 seconds relay 1H618 is energized and changes its position which causes relay 1H682 to be be energized ; the latter controls closing of the cabin isolation valve.. When relay 1H618 is energized it transmits a signal to the master warning and de-energizes the shut off valve winding of dual pressure reducing shut off valve 1h646, while de-energized relay 1H661 cuts out power supply to pressure reduçing valve winding.
Relay 1H682 is self-held via the following circuits :

Stage B of 1H682
Stage B of 1H618
Stage A of 1H619

This causes relays 1H618 and 1H707 to be latched.

(2) Warning cancellation by DUCT warning light.
When the DUCT warning light is pressed and released a pulse is fed to relay 1H619 which cancels the warning provided that relays 1H682, 1H618, 1H707 are de-ener-

INTENTIONALLY BLANK

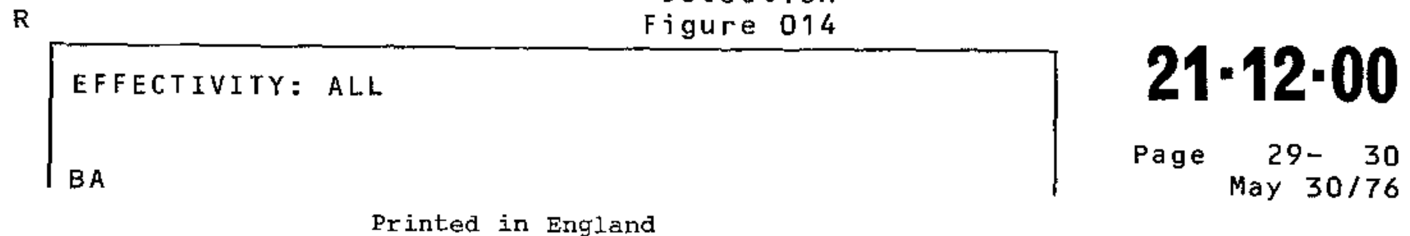
OVERHEAT DETECTION
OVER PRESS OR DUCT LIGHT TEST
REOPENING BY OVER PRESS LIGHT TEST

KEY : E - ENERGIZED
D - DE-ENERGIZED
O - OPEN
C - CLOSED

CMA 21 12 00 0 AXM0

Operation of Safety System After Overheat Detection
Figure 014

R


EFFECTIVITY: ALL
BA

Printed in England

gized by de-energized relay 1H679. The warning light goes off only when relay 1H687 is energized by open end-of travel microswitch of cabin isolation valve 1H678.

(3) Cancellation by emergency shut down handle. If after a cabin inlet overheat warning, the emergency shut down handle W160 is pulled. relay 1H686 is energized and operates as overheat thermoswitch 1H679 ; 28 V power supply is cut to the warning light, which goes off. Relay 1K232 is also emnergized which cuts out the + 28 V signal to the AIR warning light. Time delay relay 1H619 is also energized and the emergency shut down handle is pushed back when overheat thermoswitch 1H679 is de-energized ; the logic relay is latched and relays 1H682, 1H707 and 1H618 are de-energized.

NOTE : During the cabin isolation valve opening time, DUCT warning light is illuminated.

(4) Operation in Test (Without air)

The test is carried out with the BLEED VALVE switch in SHUT position
The other switches associated with the air generation system can be in any position. The test is carried out by pressing DUCT warning light. The AIR warning light comes on and the gong sounds with a delay of 2 seconds. DUCT warning light comes on only when the cabin isolation valve is fully open.
Hold the warning light pressed until it comes on to check that the valve closes. Then release the warning light which goes off only when the valve is fully open (as for a memorization after triggering of the warning) Logic Relay.

When warning light 1H629 is pressed the 28 V power supply to DUCT warning light is cut out and relay 1H686 is energized ; relay 1H619 is also energized to prevent memorization of the warning. Relay 1H686 enables energization of relays 1H707 and 1H618 with a delay of 2 seconds ; relay 1H686 transmits a warning signal to the AIR warning light on master warning panel. When relay 1H618 is energized, it transmits + 28 Volts power supply to relay 1H682 which is energized and controls closing of cabin isolation valve.
When the valve is completely closed, its closing end of travel microswitch delivers a + 28 V power supply to DUCT warning light 1H629 (through emergency shut down handle 1W160 when de-energized). The warning light 1H619 is released, relays 1H686, 1H682, 1H707 and 1H619

are de-energized but the warning light remains energized through de-energized relay 1H687.
The warning light goes off only when the opening end-of-travel microswitch of cabin isolation valve 1H678 energizes relay 1H687.

(5) Control by means of emergency shut down handle.
It is possible to close the cross bleed valve of groups 1 and 2 and the dual pressure reducing shut off valve of group 1 by pulling engine 1 emergency shut down handle. DUCT and OVER/PRESS warning lights do not come on. The warnings do not operate on master warning panel.

Logic Relay

When emergency shut down handle 1W160 is energized, it energizes relay 1H686 which simulates a wing overheat ; + 28 V power supply to DUCT warning light 1H629 and to AIR warning light is cut out.

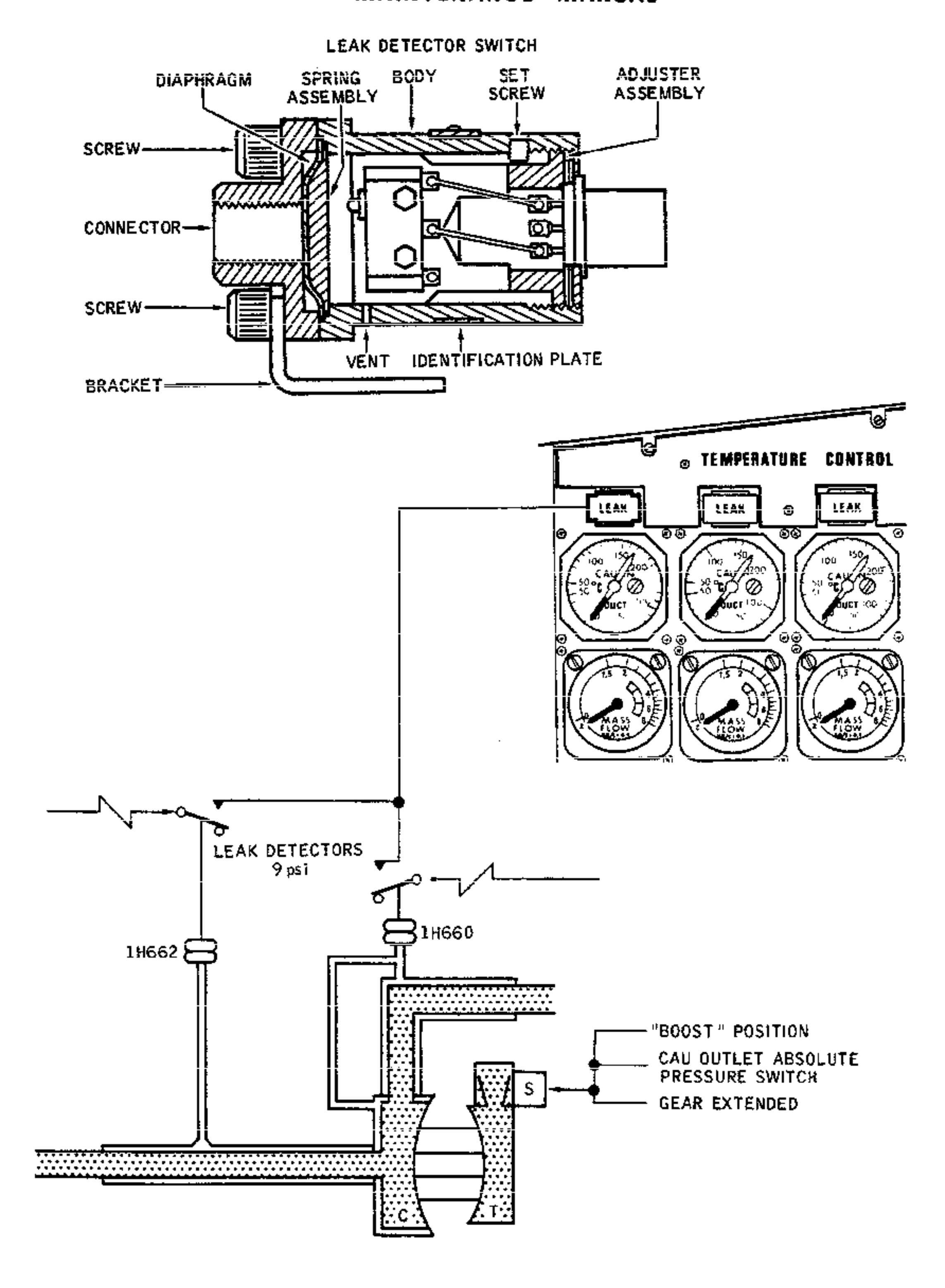
9. Leak Detectors (Ref. Fig. 015)

The compressor inlet and outlet ducts and compressor housing are equipped with double walls in order to avoid excessive temperature in the wing if the duct or compressor housing inner wall breaks.
A cold air unit leak detector (1H660) located on Cold Air Unit upstream duct and a Cold Air Unit double wall pipe leak detector (1H662) located on Cold Air Unit outlet duct detect leaks if the inner walls break.
If the pressure leak is equal to or greater than 9 psi (0.62 bars), the leak detector transmits a signal to the LEAK warning light on TEMPERATURE CONTROL panel.

It is not necessary to shut down the group if the LEAK warning light comes on.

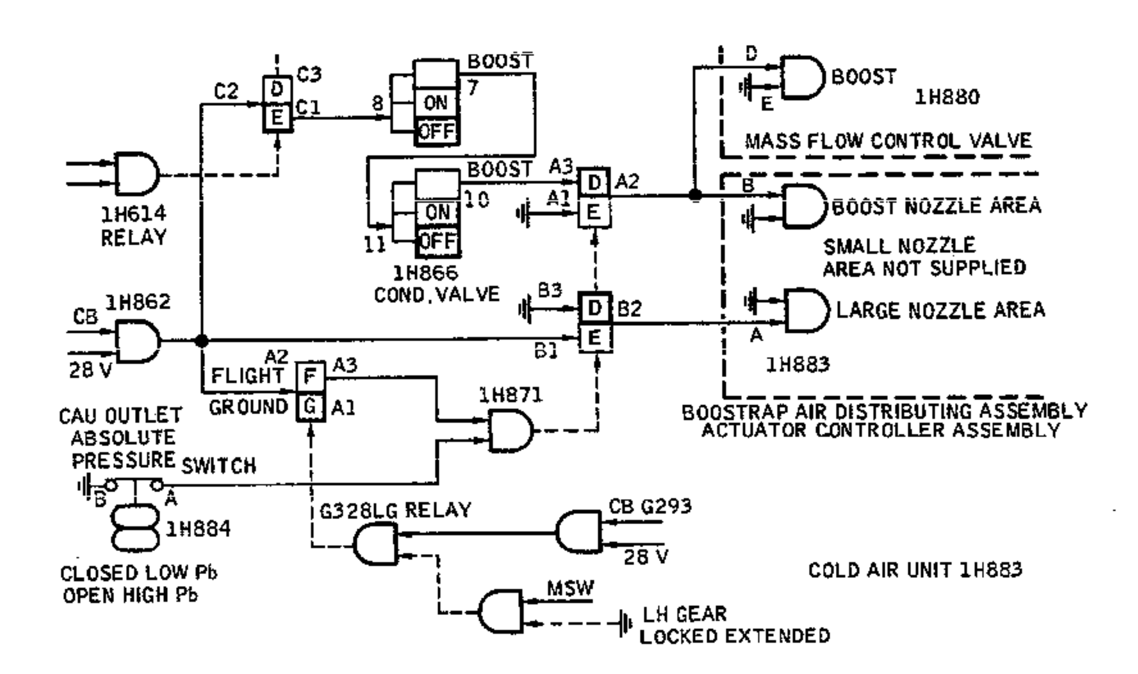
NOTE : If both walls break (very seldom the case) the NAC WING OVERHEAT warning light comes on. This has no effect on faulty group closing but can confirm the LEAK warning ; in this case the instructions are to shut down the faulty group.

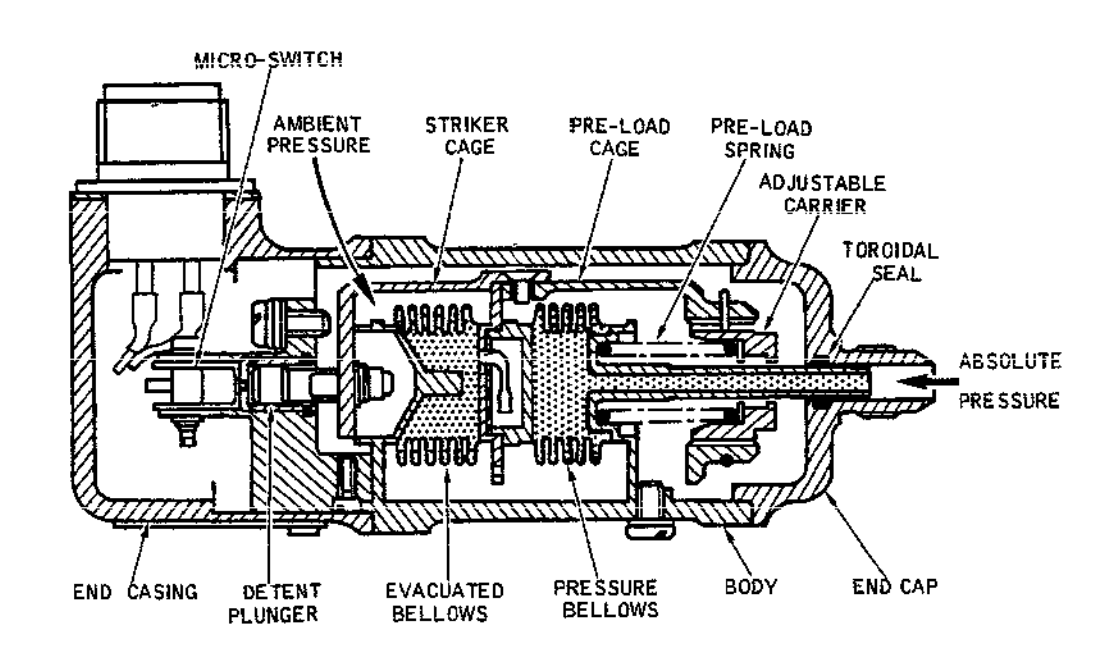
10. Operation of the Boostrap Air Distributing Assembly Actuator Controller according to the aircraft configuration (ground or flight), and to the position of COND VALVE switch 1H866 OFF-ON-BOOST and of Cold Air Unit absolute pressure switch 1H884. (Ref. Fig. 016)



CMA 21 12 00 0 AZM0

R Cold Air Unit Leak Detector
Figure 015





CMA 21 12 00 0 BAMO

R

Operation of CAU absolute pressure switch
Figure 016

A. On the ground, COND VALVE switch 1H866 in OFF or ON position

On the ground, relay G328 cuts out power of relay 1H871 ; the latter remains de-energized and cuts out power supply from circuit breaker 1H862. COND VALVE switch 1H886 cuts out the other power supply ; the bootstrap actuator controller is not supplied. The nozzle area does not change -small area-.

B. On ground, COND VALVE switch 1H866 in BOOST position

For the same reasons as in pargraph (1), relay 1H871 remains de-energized via wafers of COND VALVE switch 1H866.
The bootstrap actuator controller and the mass flow control valve are supplied through relay 1H871 contacts, when it is de-energized via the two wafers of COND VALVE switch 1H866 -BOOST nozzle area for turbine inlet and valve-.

C. Ground Test -Primary - secondary- DUCT 1 - DUCT 2 COND VALVE switch in ON or BOOST position.

On the ground, relay 1H871 is de-energized, it cuts out power from circuit breaker 1H862 ; since relay 1H614 is de-energized -when tests are carried out, it also cuts out power supply-.
For this reason, whatever the COND VALVE switch 1H866 position, the bootstrap actuator controller cannot be supplied. The nozzle area does not change -small area-.

D. In flight, COND VALVE switch is ON position, closed if Pb < 40 psi. CAU absolute pressure switch 1H884 is closed for a Pb < 40 psi.
Relay 1H871 is energized ; it is supplied with 28 VDC and grounded through CAU absolute pressure switch 1H884.
The Bootstrap actuator controller assembly is supplied through relay 1H871 when it is energized -large nozzle area is set-.

E. In flight, with COND VALVE switch 1H866 in ON position, CAU absolute pressure switch open for a Pb ≥ 40 psi

Relay 1H871 is de-energized because ground is cut out by CAU absolute pressure switch 1H884 which detects a pressure greater than 40 psi ; relay 1H871 cuts out power from circuit breaker 1H862 -small nozzle area is set-.

F. In flight, COND VALVE switch 1H866 in BOOST position.
CAU absolute pressure switch open for Pb ≥ 40 psi

Relay 1H871 is de-energized and cuts out power supply

to Bootstrap actuator controller engaging the large nozzle area; through its second contact it enables power from COND VALVE switch 1H866 in BOOST position to supply the bootstrap actuator controller engaging the BOOST nozzle area.
It also allows the mass flow control valve to be set to BOOST position.

G. In flight, COND VALVE switch in BOOST position.
CAU absolute pressure switch closed for a Pb pressure lower than 40 psi.

Relay 1H871 is grounded by CAU absolute pressure switch 1H884, it is energized; one of the contacts of relay 1H871 cuts out the order transmitted by COND VALVE switch 1H866, the other one supplies the Bootstrap actuator controller engaging the large nozzle area.

11. Cold Air Unit Outlet Overpressure Pressure Switch 1H659
(Ref. Fig. 017)

The cold air unit outlet overpressure pressure switch detects overpressures (P 10 psig) occurring between the pressurized fuselage and the cold air unit downstream pressure. If the detected overpressure (P 10 psig) lasts more than 2 seconds, DUCT indicator light comes on; AIR warning light also comes on on master warning panel. The mass flow control and air conditioning valves close and the group is shut down.
A self holding system holds the group closed even if the warning light goes off, DUCT indicator light remains illuminated. DUCT indicator light goes off only if the two following conditions are met:

- COND VALVE switch in OFF position (the warning self holding system is no longer effective
- The fault disappears

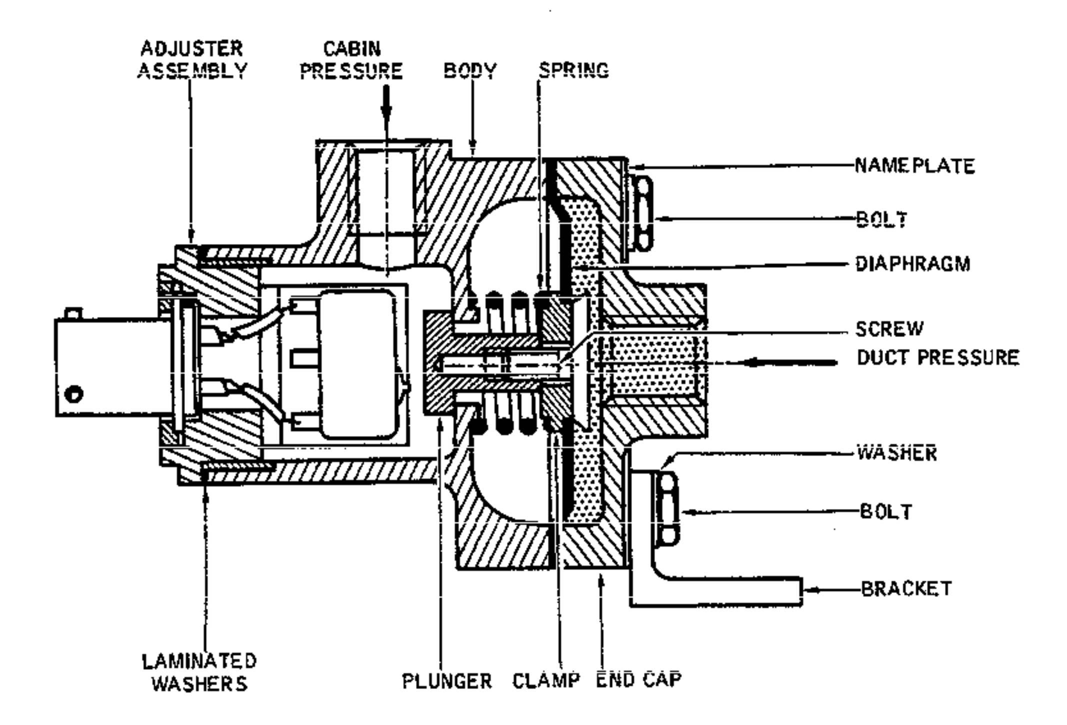
If the indicator light goes off the Flight Engineer can open the group again by placing the COND VALVE switch again in OPEN position.

RB 12. Air Conditioning - Duct Supports

RB Ducts, in the wing and fuselage air conditioning bay, are supported
RB by rods or links with loose fitting spacer ends.

RB These spacers are designed to have a minimum angular movement
RB of ± 4 degrees.

RB RADIAL PLAY FOR THE SMALL SPACER, 10-32 UNF IS 0.5mm, 0.019 ins.
RB RADIAL PLAY FOR THE LARGER SPACER, 1/4 UNF IS 0.9mm, 0.035 ins.



Cold Air Unit Outlet
Overpressure Pressure Switch
Figure 017

TEMPERATURE LIMITING - TROUBLE SHOOTING

WARNING : OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

1. General

The following trouble shooting procedures are intended to enable faults found in the temperature limiting system in flight or on the ground, to be quickly rectified.
These defects can be isolated with the aid of the trouble shooting procedures.

All procedures dealing with trouble shooting are based on the assumption that the electrical wiring is serviceable.
If the fault is not rectified, check the wiring in accordance with the wiring diagram manual.
The system consists of four identical groups. The trouble shooting procedure is described only for group 1.
The designation, item, and location of components corresponding to groups 2, 3 and 4 are listed in the component identification table. During the trouble shooting procedures the aircraft is on the ground with shock absorber compressed.

When the aircraft is on the ground with engine shut down the temperature limiting system cannot be tested completely.
The trouble shooting procedure deals only with trouble shooting symptoms noticed with engine running on the ground or in flight.
During trouble shooting on the ground, the ground air supply unit mentioned in paragraph 2A will be used if necessary to simulate the operation of the various valves. However it is not possible to obtain a correct pressure, temperature or airflow with the ground air supply units available.

2. Prepare

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Ground Air Supply Unit	
- Relative Minimum Pressure : 2 Bars Minimum Airflow 0.4 Kg/s	
- Relative Maximum Pressure : 4.5 Bars Maximum Airflow 0.6 Kg/s The Temperature Must Not Exceed 300°C	
Multimeter	

B. Prepare

(1) Check that the circuit breakers are set : Ref. 21-10-00, Paragraph 2.

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(3) Connect ground air supply unit, if necessary and pressurize the aircraft system.
Follow instructions described in 21-11-14, Adjustment/Test.

3. Trouble Shooting

```
*****************************************************
* System not operating. PRIM EXCH, SEC EXCH, DUCT   *
* FUEL EXCH warning lights are extinguished.        *
*****************************************************
  ||          |
  OK        NOT OK ---------------------------------------------------
  ||          |   | COND VALVE 1 switch in OFF position               |
  ||          |   | PRIM EXCH, SEC EXCH, DUCT, FUEL EXCH warning      |
  ||          |---| lights are illuminated.                           |
  ||              |                                                   |
  ||              | Ref. Chart 101                                    |
  ||               ---------------------------------------------------
  ||
*****************************************************
* System not operating. PRIM EXCH warning light is  *
* extinguished.                                     *
*****************************************************
  ||          |    ---------------------------------------------------
  OK        NOT OK | COND VALVE 1 switch in OFF position              |
  ||          |    | PRIM EXCH warning light is illuminated.          |
  ||               |                                                  |
  ||               | Ref. Chart 102                                   |
  ||                ---------------------------------------------------
  ||
*****************************************************
* System not operating. SEC EXCH warning light is   *
* extinguished.                                     *
*****************************************************
  ||          |
  OK        NOT OK ---------------------------------------------------
  ||          |   | COND VALVE 1 switch in OFF position               |
  ||          |---| SEC EXCH warning light is illuminated             |
  ||              |                                                   |
  ||              | Ref. Chart 103                                    |
  ||               ---------------------------------------------------
*****************************************************
* System not operating. DUCT warning light is       *
* extinguished.                                     *
*****************************************************
  ||          |
  OK        NOT OK ---------------------------------------------------
  ||          |   | COND VALVE 1 switch in OFF position.              |
  ||          |---| Duct warning light is illuminated.                |
  ||              |                                                   |
  ||              | Ref. Chart 104                                    |
  ||               ---------------------------------------------------
```

```
  ||
*****************************************************
* System not operating. LEAK warning light is       *
* extinguished.                                     *
*****************************************************
  ||          |
  OK      NOT OK ----------------------------------------------------
  ||          |   | COND VALVE switch in OFF position                |
  ||          |   | LEAK warning light is illuminated                |
  ||          |---|                                                  |
  ||              | Ref. Chart 105                                   |
  ||              ----------------------------------------------------
  ||
*****************************************************
* PRIM, SEC, FUEL, DUCT 1, DUCT 2, FLOW, COND tests *
* are correct for the four groups.                  *
*****************************************************
  ||          |
  ||          |   ----------------------------------------------------
  OK      NOT OK  | AIR COND TEST switch in TEST position            |
  ||          |   | Rotary test switch is placed successively        |
  ||          |---| in each position.                                |
  ||              | The warning lights associated with the four      |
  ||              | groups are extinguished.                         |
  ||              |                                                  |
  ||              | Ref. Chart 106                                   |
  ||              ----------------------------------------------------
  ||
*****************************************************
* PRIM, SEC, FUEL, DUCT 1, DUCT 2, FLOW, COND tests *
* are correct for group 1.                          *
*****************************************************
  ||          |
  OK      NOT OK ----------------------------------------------------
  ||          |   | COND VALVE switches in ON position               |
  ||          |   | AIR COND TEST switch in TEST position            |
  ||          |   | Rotary test switch is placed successively in     |
  ||          |   | each position.                                   |
  ||          |   | GR1 warning lights do not come on                |
  ||          |---| Normal indication on 1, 2, 3, 4 MASS FLOW        |
  ||              | indicator                                        |
  ||              | No master warning in PRIM position               |
  ||              | Groups 2, 3, 4 warning lights come on            |
  ||              |                                                  |
  ||              | Ref. Chart 107                                   |
  ||              ----------------------------------------------------
  ||
```

```
**************************************************
* PRIM, SEC, FUEL, DUCT 1, DUCT 2, FLOW, COND tests *
* are correct for group 2.                         *
**************************************************
  ||          |
  OK        NOT OK ----------------------------------------------------
  ||          |   | COND VALVE switches in ON position                  |
  ||          |   | AIR COND TEST SWITCH in TEST position               |
  ||          |   | Rotary test switch is placed successively in        |
  ||          |   | each position.                                      |
  ||          |   | GR2 warning lights do not come on.                  |
  ||          |---| normal indication on 1, 2, 3, 4 MASS FLOW          |
  ||              | indicator.                                          |
  ||              | No master warning in SEC position                   |
  ||              | Group 1, 3, 4 warning lights come on                |
  ||              |                                                     |
  ||              | Ref. Chart 107                                      |
  ||               ----------------------------------------------------
  ||
**************************************************
* PRIM, SEC, FUEL, DUCT 1, DUCT 2, FLOW, COND tests *
* are correct for group 3.                         *
**************************************************
  ||          |
  OK        NOT OK ----------------------------------------------------
  ||          |   | COND VALVE switches in ON position                  |
  ||          |   | AIR COND TEST switch in TEST position               |
  ||          |   | Rotary test switch is placed successively in        |
  ||          |   | each position.                                      |
  ||          |   | GR3 warning lights do not come on                   |
  ||          |---| Normal indication on 1, 2, 3, 4 MASS FLOW          |
  ||              | indicator                                           |
  ||              | No master warning in DUCT 1 position                |
  ||              | Group 1, 2, 4 warning lights come on                |
  ||              |                                                     |
  ||              | Ref. Chart 107                                      |
  ||               ----------------------------------------------------
  ||
```

```
*****************************************************
* PRIM, SEC, FUEL, DUCT 1, DUCT 2, FLOW, COND tests *
* are correct for group 4.                          *
*****************************************************
  ||        |
  OK      NOT OK ---------------------------------------------------
  ||        |   | COND VALVE switches in ON position                |
  ||        |   | AIR COND TEST SWITCH in TEST position             |
  ||        |   | Rotary test switch placed successively in each   |
  ||        |   | position.                                         |
  ||        |   | Group 4 warning lights do not come on.            |
  ||        |---| Normal indication on 1,2,3,4 MAS FLOW indicator|
  ||            | No master warning in DUCT 2 position              |
  ||            | Group 1, 2, 3 warning lights come on              |
  ||            |                                                   |
  ||            | Ref. Chart 107                                    |
  ||            ---------------------------------------------------
  ||
*****************************************************
* When FUEL, O/PRESS, FLOW tests are correct, PRIM, *
* SEC, DUCT 1, DUCT 2, SMOKE tests are correct      *
* (Group 1)                                         *
*****************************************************
  ||        |
  OK      NOT OK ---------------------------------------------------
  ||        |   | COND VALVE switches in ON position                |
  ||        |   | AIR COND TEST switch in TEST position             |
  ||        |   | Rotary test switch in PRIM, SEC, DUCT 1, DUCT 2|
  ||        |   | positions.                                        |
  ||        |   | Group 1 warning lights do not come on             |
  ||        |---| No master warning in PRIM position                |
  ||            | The 4 FUEL warning lights come on (Rotary         |
  ||            | test switch in FUEL position)                     |
  ||            | Group 2, 3, 4 warning lights come on.             |
  ||            |                                                   |
  ||            | Ref. Chart 108                                    |
  ||            ---------------------------------------------------
  ||
  ||
```

```
***************************************************
* When FUEL, O/PRESS, FLOW, tests are correct,    *
* PRIM, SEC, DUCT 1, DUCT 2, SMOKE tests are correct*
* (Group 2)                                       *
***************************************************
  ||          |
  OK        NOT OK ---------------------------------------------------
  ||          |   | COND VALVE switch in ON position                 |
  ||          |   | AIR COND TEST switch in TEST position            |
  ||          |   | Rotary test switch in PRIM, SEC, DUCT 1          |
  ||          |   | DUCT 2 position.                                 |
  ||          |   | Group 2 warning lights do not come on            |
  ||          |---| No master warning in PRIM position.              |
  ||              | Groups 1, 3, 4 warning lights come on            |
  ||              | The four FUEL warning lights come on             |
  ||              | (Rotary test switch in FUEL position)            |
  ||              |                                                  |
  ||              | Ref. Chart 108                                   |
  ||              ---------------------------------------------------
  ||
***************************************************
* When FUEL, O/PRESS, FLOW tests are correct,     *
* PRIM, SEC, DUCT 1, DUCT 2, SMOKE tests are correct*
* (Group 3)                                       *
***************************************************
  ||          |
  OK        NOT OK ---------------------------------------------------
  ||          |   | COND VALVE switch in ON position                 |
  ||          |   | AIR COND TEST switch in TEST position            |
  ||          |   | Rotary test switch in PRIM, SEC, DUCT 1,         |
  ||          |   | DUCT 2 positions.                                |
  ||          |   | Group 3 warning lights do not come on            |
  ||          |---| No master warning in PRIM position               |
  ||              | Group 1, 2, 4 warning lights come on             |
  ||              | The four FUEL warning lights come on (Rotary     |
  ||              | test switch in FUEL position).                   |
  ||              |                                                  |
  ||              | Ref. Chart 108                                   |
  ||              ---------------------------------------------------
  ||
```

```
****************************************************
* When FUEL, O/PRESS, FLOW, tests are correct,     *
* PRIM, SEC, DUCT 1, DUCT 2, SMOKE tests are correct*
* (Group 4)                                        *
****************************************************
   ||           |
   OK        NOT OK -------------------------------------------------
   ||           |    | COND VALVE switch in ON position                |
   ||           |    | AIR COND TEST switch in TEST position           |
   ||           |    | Rotary test switch successively in PRIM, SEC,   |
   ||           |    | DUCT 1, DUCT 2 positions.                       |
   ||           |    | Group 4 warning lights do not come on           |
   ||           |--- | No master warning in PRIM position.             |
   ||                | Groups 1, 2, 3 warning lights come on           |
   ||                | With rotary test switch in FUEL position,       |
   ||                | the four FUEL warning lights come on            |
   ||                |                                                 |
   ||                | Ref. Chart 108                                  |
   ||                 -------------------------------------------------
   ||
****************************************************
* System operating, PRIM, SEC, DUCT 1, DUCT 2 and  *
* SMOKE tests are inoperative.                     *
* The air conditioning valve closes during the     *
* FLOW test.                                       *
****************************************************
   ||           |
   OK        NOT OK -------------------------------------------------
   ||           |    | COND VALVE 1 switch in ON position              |
   ||           |    | AIR COND TEST switch in TEST position.          |
   ||           |    | Rotary test switch in PRIM position             |
   ||           |    | Rotary test switch in SEC position              |
   ||           |    | Rotary test switch in DUCT 1 position           |
   ||           |=== | Rotary test switch in DUCT 2 position           |
   ||                | Group 1 warning lights do not come on           |
   ||                | During the FLOW test, air conditioning valve    |
   ||                | closes.                                         |
   ||                |                                                 |
   ||                | Replace relay 1H676 [28]                        |
   ||                 -------------------------------------------------
   ||
```

```
**************************************************
* Group 1, 2, 3, 4 PRIM test is correct.         *
**************************************************
   ||        |
   ||        |   -----------------------------------------------
   OK      NOT OK | AIR COND TEST switch in TEST position.        |
   ||        |   | Rotary test switch in PRIM position.          |
   ||        |---| PRIM EXCH 2, 3, 4 warning lights illuminated  |
   ||            | PRIM EXCH 1 warning light extinguished        |
   ||            | (If group 1 is failed : no master warning)    |
   ||            | Ref. Chart 109                                |
   ||            -----------------------------------------------
   ||
**************************************************
* Group 1, 2, 3, 4 SEC test is correct.          *
**************************************************
   ||        |
   ||        |   -----------------------------------------------
   OK      NOT OK | AIR COND TEST switch in TEST position         |
   ||        |   | Rotary test switch in SEC position.           |
   ||        |---| SEC EXCH 2, 3, 4 warning lights illuminated   |
   ||            | SEC EXCH 1 warning light extinguished.        |
   ||            | (If group 2 is failed : no master warning)    |
   ||            | Ref. Chart 110                                |
   ||            -----------------------------------------------
   ||
**************************************************
* Groups 1,2,3,4 DUCT1,DUCT2 tests are correct.  *
**************************************************
   ||        |
   ||        |   -----------------------------------------------
   OK      NOT OK | AIR COND TEST switch in TEST position         |
   ||        |   | Rotary test switch in DUCT 1 position         |
   ||        |---| Rotary test switch in DUCT 2 position         |
   ||            | Group 2, 3, 4 DUCT warning lights illuminated |
   ||            | Group 1 DUCT warning light extinguished       |
   ||            | Ref. Chart 111                                |
   ||            -----------------------------------------------
   ||
   ||
```

```
**************************************************
* Group 1,2,3,4 DUCT1 test is correct.           *
**************************************************
  ||
  ||     |   -----------------------------------------------------
  OK  NOT OK | AIR COND TEST switch in TEST position               |
  ||     |   | Rotary test switch in DUCT 1 position               |
  ||     |---| Group 2,3,4 DUCT warning lights illuminated         |
  ||         | Group 1 DUCT warning light extinguished             |
  ||         | (If group 3 is failed : no master warning)          |
  ||         | Ref. Chart 112                                      |
  ||         -----------------------------------------------------
  ||
**************************************************
* Group 1,2,3,4 DUCT2 test is correct            *
**************************************************
  ||     |
  OK  NOT OK -----------------------------------------------------
  ||     |   | AIR COND TEST switch in TEST position               |
  ||     |   | Rotary test switch in DUCT2 position                |
  ||     |---| Group 2,3,4 DUCT warning lights illuminated         |
  ||         | Group 1 DUCT warning light extinguished             |
  ||         | (If group 4 is failed : no master warning)          |
  ||         | Ref. Chart 113                                      |
  ||         -----------------------------------------------------
  ||
**************************************************
* PRIM and SEC tests are correct                 *
**************************************************
  ||     |
  ||     |   -----------------------------------------------------
  OK  NOT OK | COND VALVE switch in ON or BOOST position            |
  ||     |   | AIR COND TEST switch in TEST position                |
  ||     |   | Rotary test switch in PRIM position                  |
  ||     |   | Rotary test switch in SEC position                   |
  ||     |---| Group 1 warning lights do not come on                |
  ||         | Group 2,3,4 warning lights come on                   |
  ||         | AIR warning light comes on on master warning panel   |
  ||         | Aural warning sounds                                 |
  ||         | Ref. Chart 114                                       |
  ||         -----------------------------------------------------
  ||
  ||
```

```
*****************************************************
* COND and FLOW tests are correct.                  *
*****************************************************
  ||          |  -----------------------------------------------------
  OK       NOT OK | COND VALVE switch in ON position                  |
  ||          |   | Normal indication on MASS FLOW indicator          |
  ||          |   | AIR COND TEST switch in TEST position             |
  ||          |---| Rotary test switch in COND position               |
  ||              | Rotary test switch in FLOW position               |
  ||              | MASS FLOW indication remains normal               |
  ||              | Replace relay 1H668 [25]                          |
  ||             -----------------------------------------------------
  ||
*****************************************************
* With FLOW test correct COND test is :             *
*****************************************************
  ||          |
  OK       NOT OK -----------------------------------------------------
  ||          |   | COND VALVE switch in ON position                  |
  ||          |   | MASS FLOW indicator indicates zero                |
  ||          |   | AIR COND TEST switch in TEST position             |
  ||          |---| Rotary test switch in COND position               |
  ||          |   | COND VALVE magnetic indicator displays open       |
  ||          |   |                                                   |
  ||          |   | Ref. Chart 115                                    |
  ||          |  -----------------------------------------------------
  ||          |
  ||          |  -----------------------------------------------------
  ||          |   | COND VALVE switch in ON position                  |
  ||          |   | MASS FLOW indicator indicates zero                |
  ||          |   | AIR COND TEST switch in TEST position             |
  ||          |---| Rotary test switch in COND position               |
  ||              | COND VALVE magnetic indicator displays shut       |
  ||              | after a lapse of 20 seconds.                      |
  ||              | Ref. Chart 116                                    |
  ||             -----------------------------------------------------
  ||
  ||
```

```
******************************************************
* With COND test correct, FLOW test is :             *
******************************************************
  ||          |
  OK       NOT OK ----------------------------------------------------
  ||          |     | COND VALVE switch in ON position                |
  ||          |     | Indication is normal on MASS FLOW indicator     |
  ||          |     | AIR COND TEST switch in TEST position           |
  ||          |---| Rotary test switch in FLOW position               |
  ||                | MASS FLOW indication remains normal             |
  ||                |                                                 |
  ||                | Ref. Chart 117                                  |
  ||                ---------------------------------------------------
  ||
******************************************************
* Master warning operates during PRIM test            *
******************************************************
  ||          |
  OK       NOT OK ----------------------------------------------------
  ||          |     | COND VALVE switch in ON position                |
  ||          |     | AIR COND TEST switch in TEST position           |
  ||          |---| Rotary test switch in PRIM position               |
  ||                | PRIM EXCH warning lights illuminated            |
  ||                | No master warning                               |
  ||                |                                                 |
  ||                | Ref. Chart 118                                  |
  ||                ---------------------------------------------------
  ||
```

```
*******************************************************
* Master warning operates during SEC test             *
*******************************************************
  ||         |
  OK       NOT OK ---------------------------------------------------
  ||         |    | COND VALVE switch in ON position                 |
  ||         |    | AIR COND TEST switch in TEST position            |
  ||         |    | Rotary test switch in SEC position               |
  ||         |----| SEC EXCH warning lights illuminated              |
  ||              | No master warning                                |
  ||              |                                                  |
  ||              | Ref. Chart 119                                   |
  ||              ---------------------------------------------------
  ||
*******************************************************
* Master warning operates during DUCT1 test           *
*******************************************************
  ||         |
  OK       NOT OK ---------------------------------------------------
  ||         |    | COND VALVE switch in ON position                 |
  ||         |    | AIR COND TEST switch in TEST position            |
  ||         |    | Rotary test switch in DUCT1 position             |
  ||         |----| DUCT warning lights illuminated                  |
  ||              | No master warning                                |
  ||              |                                                  |
  ||              | Ref. Chart 120                                   |
  ||              ---------------------------------------------------
  ||
*******************************************************
* Master warning operates during DUCT2 test           *
*******************************************************
  ||         |
  OK       NOT OK ---------------------------------------------------
  ||         |    | COND VALVE switch in ON position                 |
  ||         |    | AIR COND TEST switch in TEST position            |
  ||         |    | Rotary test switch in DUCT 2 position            |
  ||         |----| DUCT warning lights illuminated                  |
  ||              | No master warning                                |
  ||              |                                                  |
  ||              | Ref. Chart 121                                   |
  ||              ---------------------------------------------------
  ||
  ||
```

```
*****************************************************
* During PRIM SEC and SMOKE tests, the DUCT warning *
* light, associated with each air conditioning group*
* must be extinguished.                             *
*****************************************************
   ||         |
   OK        NOT OK --------------------------------------------------
   ||         |   | AIR COND TEST switch in TEST position            |
   ||         |   | Rotary test switch in PRIM position              |
   ||         |   | Rotary test switch in SEC position               |
   ||         |   | The corresponding warning lights come on         |
   ||         |---| SMOKE rotary test switch is placed in TEST       |
   ||             | position. The four SMOKE warning lights are      |
   ||             | illuminated.                                     |
   ||             | DUCT warning light illuminated                   |
   ||             | Ref. Chart 122                                   |
   ||             ----------------------------------------------------
   ||
*****************************************************
* During PRIM DUCT1, DUCT2, SMOKE tests, the SEC    *
* EXCH warning light associated with each air condi-*
* tioning group must be extinguished                *
*****************************************************
   ||         |
   OK        NOT OK --------------------------------------------------
   ||         |   | AIR COND TEST switch in TEST position            |
   ||         |   | Rotary test switch in PRIM position              |
   ||         |   | Rotary test switch in DUCT1 position             |
   ||         |---| Rotary test switch in DUCT2 position             |
   ||             | SMOKE rotary test switch in TEST position        |
   ||             | The four SMOKE warning lights are illuminated    |
   ||             | SEC EXCH warning light is illuminated            |
   ||             |                                                  |
   ||             | Replace diode 1H640 [9]                          |
   ||             ----------------------------------------------------
   ||
```

```
**************************************************
* During SEC, DUCT1, DUCT2 and SMOKE test, the PRIM *
* warning light associated with each air          *
* conditioning group must be extinguished.        *
**************************************************
  ||        |
  OK        NOT OK ---------------------------------------------
  ||        |     | AIR COND TEST switch in TEST position       |
  ||        |     | Rotary test switch in SEC position          |
  ||        |     | Rotary test switch in DUCT1 position        |
  ||        |     | Rotary test switch in DUCT2 position        |
  ||        |     | The corresponding warning lights come on    |
  ||        |---| SMOKE rotary test switch in TEST position   |
  ||              | The four SMOKE warning lights come on       |
  ||              | PRIM EXCH warning light illuminated         |
  ||              |                                             |
  ||              | Replace diode 1H639 [8]                     |
  ||               ---------------------------------------------
  ||
**************************************************
* During PRIM, SEC, DUCT1 and DUCT2 test, the SMOKE *
* warning light associated with each air          *
* conditioning group must be extinguished.        *
**************************************************
  ||        |
  OK        NOT OK ---------------------------------------------
  ||        |     | AIR COND TEST switch in TEST position       |
  ||        |     | Rotary test switch in PRIM position         |
  ||        |     | Rotary test switch in SEC position          |
  ||        |     | Rotary test switch in DUCT1 position        |
  ||        |---| Rotary test switch in DUCT2 position        |
  ||              | The corresponding warning lights come on    |
  ||              | SMOKE warning light comes on.               |
  ||              |                                             |
  ||              | Replace diode 1H702 [38]                    |
  ||               ---------------------------------------------
  ||
```

```
*****************************************************
* After PTT test, DUCT warning light comes on       *
*****************************************************
  ||        |
  OK        NOT OK -----------------------------------------------------
  ||        |     | BLEED VALVE switch in OPEN position                 |
  ||        |     | DUCT1 warning light is pressed. AIR warning         |
  ||        |---| light does not come on on master warning panel      |
  ||        |     | No aural warning.                                   |
  ||        |     | DUCT1 warning light extinguished.                   |
  ||        |     | Ref. Chart 123                                      |
  ||        |     -----------------------------------------------------
  ||        |
  ||        |     -----------------------------------------------------
  ||        |     | BLEED VALVE switch in OPEN position.                |
  ||        |     | DUCT1 warning light is pressed, AIR warning         |
  ||        |---| light comes on on master warning panel              |
  ||        |     | Associated aural warning sounds                     |
  ||        |     | DUCT1 warning light extinguished.                   |
  ||        |     |                                                     |
  ||        |     | Ref. Chart 124                                      |
  ||        |     -----------------------------------------------------
*****************************************************
* DUCT warning light remains illuminated for 3 to 5 *
* seconds after PTT test.                           *
*****************************************************
  ||        |
  OK        NOT OK -----------------------------------------------------
  ||        |     | BLEED VALVE switch is in OPEN position              |
  ||        |     | DUCT1 warning light is pressed ; it comes on        |
  ||        |     | DUCT1 warning light is released, it goes off        |
  ||        |---| immediately.                                        |
  ||              |                                                     |
  ||              | Ref. Chart 125                                      |
  ||              -----------------------------------------------------
  ||
```

```
*****************************************************
* MW operates during DUCT1 PTT test                 *
*****************************************************
  ||        |
  OK       NOT OK -----------------------------------------------
  ||        |   | BLEED VALVE switch in OPEN position           |
  ||        |   | Press DUCT1 warning light ; it comes on       |
  ||        |---| Master warning does not operate.              |
  ||            |                                               |
  ||            | Replace diode 1H693 [37]                      |
  ||            -------------------------------------------------
  ||
*****************************************************
* DUCT warning light comes on during PTT test       *
* Release it ; it goes off 3 to 5 seconds later     *
*****************************************************
  ||        |
  OK       NOT OK -----------------------------------------------
  ||        |   | BLEED VALVE switch in OPEN position           |
  ||        |---| Release DUCT1 warning light ; illuminated     |
  ||            |                                               |
  ||            | Ref. Chart 126                                |
  ||            -------------------------------------------------
  ||
*****************************************************
* The air conditioning group is rearmed after a     *
* DUCT warning caused by an overheat warning        *
* (Temperature greater than or equal to 210°C).     *
*****************************************************
  ||        |
  OK       NOT OK -----------------------------------------------
  ||        |   | AIR warning light is illuminated              |
  ||        |   | Associated aural warning sounds.              |
  ||        |   | DUCT warning light comes on                   |
  ||        |---| BLEED VALVE switch in SHUT position           |
  ||            | Press DUCT warning light or pull and push back |
  ||            | Engine shut down handle.                      |
  ||            |                                               |
  ||            | Replace diode 1H688 [35]                      |
  ||            -------------------------------------------------
  ||
```

```
*****************************************************
* Group 1 cross bleed valve closes when group 2 DUCT*
* PTT test is performed.                            *
*****************************************************
  ||        |
  OK        NOT OK ---------------------------------------------------
  ||        |    | GR1, GR2, CROSS BLEED magnetic indicators         |
  ||        |    | display open.                                     |
  ||        |    | GR1 DUCT warning light pressed and illuminated    |
  ||        |    | GR1 CROSS BLEED magnetic indicator                |
  ||        |----| displays open.                                    |
  ||             | GR2 CROSS BLEED magnetic indicator                |
  ||             | displays shut                                     |
  ||             |                                                   |
  ||             | Ref. Chart 127                                    |
  ||             ---------------------------------------------------
  ||
*****************************************************
* Group 2 cross bleed valve closes when group 1     *
* DUCT PTT test is performed.                       *
*****************************************************
  ||        |
  OK        NOT OK ---------------------------------------------------
  ||        |    | GR1 and GR2 CROSS BLEED magnetic indicators       |
  ||        |    | display open                                      |
  ||        |    | GR1 DUCT warning light pressed and illuminated    |
  ||        |    | GR1 CROSS BLEED magnetic indicator displays       |
  ||        |----| shut                                              |
  ||             | GR2 CROSS BLEED magnetic indicator displays       |
  ||             | open                                              |
  ||             |                                                   |
  ||             | Ref. Chart 128                                    |
  ||             ---------------------------------------------------
*****************************************************
* Group 3 cross bleed valve closes when group 4     *
* PTT test is performed.                            *
*****************************************************
  OK        NOT OK ---------------------------------------------------
  ||        |    | GR3 and GR4 CROSS BLEED magnetic indicators       |
  ||        |    | display open.                                     |
  ||        |    | GR4 DUCT warning light pressed and illuminated    |
  ||        |----| GR3 CROSS BLEED magnetic indicator displays       |
  ||             | open                                              |
  ||             | GR4 CROSS BLEED magnetic indicator displays       |
  ||             | shut                                              |
  ||             |                                                   |
  ||             | Ref. Chart 129                                    |
  ||             ---------------------------------------------------
  ||
```

```
**************************************************
* Group 4 cross bleed valve closes when group 3  *
* DUCT PTT test is performed.                     *
**************************************************
  OK        NOT OK ------------------------------------------------
  ||             |   | GR3 and GR4 cross bleed magnetic indicators  |
  ||             |   | display OPEN.                                |
  ||             |   | GR3 DUCT warning light pressed and illuminated|
  ||             |   | GR3 CROSS BLEED magnetic indicator displays  |
  ||             |   | shut                                         |
  ||             |   | GR4 CROSS BLEED magnetic indicator displays  |
  ||             |   | open                                         |
  ||             |   | Ref. Chart 130                               |
  ||             |   ------------------------------------------------
**************************************************
* With air conditioning group operating, PRIM    *
* warning light is extinguished.                 *
**************************************************
  OK        NOT OK ------------------------------------------------
  ||             |   | COND VALVE switch in ON or BOOST position.   |
  ||             |   | PRIM EXCH warning light is illuminated       |
  ||             |   | AIR warning light comes on on master warning |
  ||             |   | panel.                                       |
  ||             |   | Associated aural warning sounds.             |
  ||             |   | COND VALVE magnetic indicator displays shut  |
  ||             |---| RAM AIR magnetic indicator displays open     |
  ||             |   | Temperature indicated on T° CAU IN indicator |
  ||             |   | is higher than 220°C.                        |
  ||             |   | Normal airflow when group is re-opened.      |
  ||             |   | RAM AIR magnetic indicator displays open     |
  ||             |   |                                              |
  ||             |   | Ref. 21-13-00, Trouble Shooting              |
  ||             |   ------------------------------------------------
  ||             |
  ||             |   ------------------------------------------------
  ||             |   | COND VALVE switch in ON or BOOST position    |
  ||             |   | PRIM EXCH warning light illuminated          |
  ||             |   | AIR warning light illuminated on master warning|
  ||             |   | panel                                        |
  ||             |   | Associated aural warning sounds              |
  ||             |   | COND VALVE magnetic indicator displays SHUT  |
  ||             |---| RAM AIR magnetic indicator displays open     |
  ||             |   | Temperature indicated on T° CAU IN indicator |
  ||             |   | is higher than 220°C.                        |
  ||             |   | Normal airflow when group is re-opened       |
  ||             |   | RAM AIR magnetic indicator displays closed   |
  ||             |   |                                              |
  ||             |   | Ref. 21-13-00, Trouble Shooting              |
  ||             |   ------------------------------------------------
  ||             |
```

AIR COND switch placed in ON or BOOST position PRIM EXCH warning light illuminated AIR warning light illuminated on master warning panel. Associated aural warning sounds COND VALVE magnetic indicator displays shut RAM AIR magnetic indicator displays open Temperature indicated on CAU IN indicator is highter than 220°C. High airflow when the group is re-opened. Ref. Chart 131

AIR COND switch in ON or BOOST position PRIM EXCH warning light illuminated AIR warning light illuminated on master warning panel. Associated aural warning sounds COND VALVE magnetic indicator displays shut RAM AIR magnetic indicator displays shut Temperature indicated on CAU IN indicator is higher than 220°. Replace ram air control valve [45]

COND VALVE switch in ON or BOOST position PRIM EXCH warning light illuminated AIR warning light illuminated on master warning panel Associated aural warning sounds COND VALVE magnetic indicator displays shut Temperature indicated on CAU IN indicator is lower than 220°. Ref. Chart 132

```
****************************************************
* Group operating, SEC EXCH warning light is       *
* extinguished.                                    *
****************************************************
  OK        NOT OK ------------------------------------------------
  ||             |   | COND VALVE switch in ON or BOOST position   |
  ||             |   | SEC EXCH warning light illuminated          |
  ||             |   | AIR warning light illuminated on master     |
  ||             |---| warning panel.                              |
  ||                 | Associated aural warning sounds.            |
  ||                 | COND VALVE magnetic indicator displays SHUT |
  ||                 | Ref. Chart 133                              |
  ||                 -----------------------------------------------
****************************************************
* Group operating DUCT warning light is            *
* extinguished.                                    *
****************************************************
  OK        NOT OK ------------------------------------------------
  ||             |   | COND VALVE switch in ON or BOOST position   |
  ||             |   | DUCT warning light is illuminated           |
  ||             |   | AIR warning light illuminated on master warning|
  ||             |   | panel                                       |
  ||             |   | Associated aural warning sounds             |
  ||             |   | COND VALVE magnetic indicator displays shut |
  ||             |---| Temperature indicated on DUCT1 temperature  |
  ||             |   | indicator is lower than 120°.               |
  ||             |   | BLEED VALVE magnetic indicator displays open|
  ||             |   |                                             |
  ||             |   | Ref. Chart 134                              |
  ||             |   -----------------------------------------------
  ||             |
  ||             |   -----------------------------------------------
  ||             |   | COND VALVE switch in ON or BOOST position   |
  ||             |   | DUCT warning light is illuminated           |
  ||             |   | AIR warning light illuminated on master     |
  ||             |   | warning panel.                              |
  ||             |   | Associated aural warning sounds.            |
  ||             |   | COND VALVE magnetic indicator displays SHUT |
  ||             |---| Temperature indicated on DUCT temperature   |
  ||                 | indicator lower than 120°.                  |
  ||                 | BLEED VALVE magnetic indicator displays SHUT|
  ||                 |                                             |
  ||                 | Replace overheat thermoswitch 1H679 [30].   |
  ||                 -----------------------------------------------
  ||
  ||
```

```
**************************************************
* The group is operating, LEAK warning light is    *
* extinguished.                                    *
**************************************************
  ||          |
  OK       NOT OK |------------------------------------------------
  ||          |   | COND VALVE switch in ON or BOOST position      |
  ||          |   | LEAK warning light is illuminated.             |
  ||          |---| NAC/WING O/HEAT warning light is extinguished. |
  ||              |                                                |
  ||              | Ref. Chart 135                                 |
  ||              --------------------------------------------------
  ||
**************************************************
* The temperature limiting system is serviceable  *
* De-energize the aircraft electrical network and *
* disconnect electrical ground power unit         *
* (Ref. 24-41-00, Servicing).                     *
**************************************************
```

```
*************************************-------------------------------
* COND VALVE 1 SWITCH IN OFF POSITION*| GROUND EQUIPMENT REQUIRED   |
* PRIM EXCH, SEC EXCH, DUCT, FUEL    *|-----------------------------|
* EXCH WARNING LIGHTS ARE ILLUMINATED*| DESCRIPTION       PART NO.  |
*************************************|-----------------------------|
*************************************| MULTIMETER                  |
* On AIR BLEED CONTROL panel, place  *-------------------------------
* FUEL VALVE switch 1H147 in OPEN    *
* then in SHUT position. FUEL VALVE  *
* magnetic indicator 1H878 must dis- *
* play the corresponding indication  *
*************************************
  ||                 |            -------------------------------
  ||                 |            | Replace circuit breaker     |
  YES                |--NO--------| 1H863 [43]                  |
  ||                                -------------------------------
********************************************
* Remove overheat safety box 1H649 [15]    *
* Measure voltage between terminal 1 and 2 *
* of connector 1H649-A.                    *
********************************************
  ||                 |            -------------------------------
 115 V               |--OV--------| Check wiring. Ref. WDM      |
  ||                              | 21-12-12.                   |
  ||                              -------------------------------
  ||
  ||
  ||                              -------------------------------
  ||------------------------------| Replace overheat safety     |
                                  | box 1H649 [15]              |
                                  -------------------------------
```

Chart 101

```
*************************************-------------------------------
* COND VALVE 1 SWITCH IN OFF POSITION*| GROUND EQUIPMENT REQUIRED  |
* PRIM EXCH WARNING LIGHT IS         *|----------------------------|
* ILLUMINATED.                       *| DESCRIPTION      PART NO.  |
*************************************|----------------------------|
                                     | MULTIMETER                  |
*************************************-------------------------------
* Remove overheat safety box 1H649   *
* [15], measure the resistance       *
* between terminal 47 and 57 of      *
* connector 1H6449-A. Resistance :   *
* 110 ohms approximately.            *
*************************************
  ||      |
  ||      |      ************************************************
  ||      |      * Disconnect connector 1H654-A from overheat   *
  YES     |--NO--* detector 1H654 [16].                         *
  ||             * Measure the resistance between terminals A and *
  ||             * B. Resistance: 110 ohms approximately.       *
  ||             ************************************************
  ||                ||         |
  ||                ||         |    ------------------------------
  ||                ||         |    | Replace overheat detector  |
  ||                YES        |-NO-| 1H654 [16].                |
  ||                ||              ------------------------------
  ||                ||
  ||                ||              ------------------------------
  ||                ||--------------| Check wiring. Ref. WDM:    |
  ||                                | 21-12-12.                  |
  ||                                ------------------------------
  ||
  ||                                ------------------------------
  ||                                | Replace overheat safety    |
  ||--------------------------------| box 1H649 [15]             |
                                    ------------------------------
```

Chart 102

```
*************************************-------------------------------
* COND VALVE 1 SWITCH IN OFF POSITION*| GROUND EQUIPMENT REQUIRED   |
* SEC EXCH WARNING LIGHT IS          *|-----------------------------|
* ILLUMINATED.                       *| DESCRIPTION       PART NO.  |
*************************************|-----------------------------|
                                     | MULTIMETER                   |
*************************************-------------------------------
* Remove overheat safety box 1H649   *
* [15]. Measure the resistance       *
* between terminal 45 and 55 of      *
* connector 1H6449-A. Resistance :   *
* 110 ohms approximately.            *
**************************************
  ||       |
  ||       |     ************************************************
  ||       |     * Disconnect connector 1H655-A from overheat     *
  YES      |--NO--* detector 1H655.                               *
  ||             * Measure the resistance between terminals A and *
  ||             * B. Resistance: 110 ohms approximately.         *
  ||             ************************************************
  ||                 ||        |
  ||                 ||        |       ----------------------------
  ||                 ||        |      | Replace overheat detector |
  ||                 YES       NO---| 1H655 [17].               |
  ||                 ||                ----------------------------
  ||                 ||
  ||                 ||                ----------------------------
  ||                 ||               | Check wiring. Ref. WDM:   |
  ||                 ||---------------| 21-12-01.                 |
  ||                                   ----------------------------
  ||
  ||                                   ----------------------------
  ||                                  | Replace overheat safety   |
  ||----------------------------------| box 1H6449 [15].          |
                                       ----------------------------
```

Chart 103

```
****************************************-------------------------------
* COND VALVE 1 SWITCH IN OFF POSITION*| GROUND EQUIPMENT REQUIRED   |
* DUCT WARNING LIGHT IS ILLUMINATED  *|-----------------------------|
**************************************| DESCRIPTION       PART NO.  |
                                      |-----------------------------|
**************************************| MULTIMETER                  |
* Remove overheat safety box 1H649   *-------------------------------
* DUCT warning light remains         *
* illuminated.                       *
**************************************
  ||        |    **********************************************
  ||        |    * On connector 1H649-A, measure the resistance *
  YES       |-NO-* between terminals 41 and 51. Resistance is  *
  ||             * 110 ohms approximately.                     *
  ||             **********************************************
  ||                ||     |    ---------------------------------
  ||                ||     |-NO-| Replace overheat detector     |
  ||                YES    |    | 1H657 [19]                    |
  ||                ||          ---------------------------------
  ||             **********************************************
  ||             * On connector 1H649-A, measure the resistance *
  ||             * between terminals 39 and 49. Resistance :   *
  ||             * 110 ohms approximately.                     *
  ||             **********************************************
  ||                ||     |    ---------------------------------
  ||                ||     |-NO-| Replace air conditioning      |
  ||                ||          | overheat detector 1H658 [20]. |
  ||                ||          ---------------------------------
  ||                ||          ---------------------------------
  ||                ||          | Replace overheat safety box   |
  ||                ||----------| 1H649 [15].                   |
  ||                            ---------------------------------
  ||
*****************************************************
* Disconnect connector 1H659=A from pressure switch *
* 1H659.                                            *
* DUCT warning light remains illuminated.           *
*****************************************************
  ||                       |
  ||                       |    ---------------------------------
  ||                       |-NO-| Replace pressure switch       |
  ||                            | 1H659 [21].                   |
  ||                            ---------------------------------
  ||
```

Chart 104 (Sheet 1 of 2)

```
  ||
  YES
  ||
***********************************************
* Connect connector 1H659-A to pressure       *
* switch 1H659 [21].                          *
* In zone 123, replace relay 1H687 [34]       *
* DUCT warning light remains illuminated.     *
***********************************************
  ||                       |
  ||                       |    -----------------------------------
  YES                      |-NO-| Relay 1H687 [34] was faulty.    |
  ||                            -----------------------------------
  ||
***********************************************
* In zone 123, on unit 7-123, on test connector*
* UT1891, measure the voltage between terminal *
* 9C and the ground.                          *
***********************************************
  ||                       |
  ||                       |    -----------------------------------
  28V                      |-0V-| Replace cabin isolation valve   |
  ||                            | 1H678 [29].                     |
  ||                            -----------------------------------
  ||
  ||                            -----------------------------------
  ||----------------------------| Replace relay 1H712 [42]        |
                                -----------------------------------
```

Chart 104 (Sheet 2 of 2)

```
**************************************
* COND VALVE SWITCH IN OFF POSITION  *
* LEAK WARNING LIGHT IS ILLUMINATED  *
**************************************

*****************************************************
* Disconnect connector 1H660-A from leak detector   *
* 1H660. LEAK warning light goes off                *
*****************************************************
  ||                         |
  ||                         |    -----------------------------------
  ||                         |    | Replace leak detector           |
  YES                        |-NO-| 1H662 [23].                     |
  ||                              -----------------------------------
  ||
  ||                              -----------------------------------
  ||                              | Replace leak detector           |
  ||------------------------------| 1H660 [22]                      |
                                  -----------------------------------
```

Chart 105

```
************************************---------------------------------
* AIR COND TEST SWITCH IN TEST       *| GROUND EQUIPMENT REQUIRED    |
* POSITION.                          *|------------------------------|
* ROTARY TEST SWITCH PLACED SUCCESS- *| DESCRIPTION         PART NO. |
* IVELY IN EACH POSITION             *|------------------------------|
* ALL WARNING LIGHTS ASSOCIATED WITH *| MULTIMETER                   |
* THE FOUR GROUPS ARE EXTINGUISHED   *--------------------------------
************************************

****************************************
* On panel 23-214, on AIR COND TEST    *
* switch H647, measure voltage         *
* between terminal 3 and the ground    *
****************************************
  ||               |
  ||               |              ---------------------------
  ||               |              | Replace AIR COND TEST   |
  28V              |--0V----------| switch H647 [13].       |
  ||                              ---------------------------
  ||
  ||                              ---------------------------
  ||                              | Replace rotary test switch |
  ||------------------------------| H648 [14].              |
                                  ---------------------------
```

Chart 106

```
*************************************-------------------------------
* COND VALVE SWITCH IN ON POSITION   *| GROUND EQUIPMENT REQUIRED  |
* AIR COND TEST SWITCH IN TEST       *|----------------------------|
* POSITION.                          *| DESCRIPTION       PART NO. |
* ROTARY TEST SWITCH PLACED SUCCESS- *|----------------------------|
* IVELY IN EACH POSITION.            *| MULTIMETER                 |
* GR1 WARNING LIGHTS DO NOT COME ON  *-------------------------------
* INDICATION IS NORMAL ON 1, 2, 3, 4 *
* MASS FLOW INDICATORS               *
* NO MASTER WARNING IN PRIM POSITION.*
* GR2, 3, 4 WARNING LIGHTS COME ON.  *
**************************************

****************************************************
* On panel 23-214, with AIR COND TEST switch in    *
* TEST position, measure voltage between terminal 3 *
* and the ground.                                  *
****************************************************
  ||                             |
  ||                             |    ------------------------------
  ||                             |   | Replace AIR COND TEST       |
 28V                             |-0V-| switch H647 [13].          |
  ||                                  ------------------------------
  ||
  ||                                  ------------------------------
  ||                                 | Replace rotary test         |
  ||---------------------------------| switch H648 [14].           |
                                      ------------------------------

   ------------------------------------------
  | GR1 terminal  3 of AIR COND TEST switch |
  |                                         |
  | GR2 terminal  6 of AIR COND TEST switch |
  |                                         |
  | GR3 terminal  9 of AIR COND TEST switch |
  |                                         |
  | GR4 terminal 12 of AIR COND TEST switch |
   ------------------------------------------
```

Chart 107

```
****************************************-------------------------------
* COND VALVE SWITCH IN ON POSITION     *| GROUND EQUIPMENT REQUIRED     |
* AIR COND TEST SWITCH IN TEST         *|-------------------------------|
* POSITION                             *| DESCRIPTION           PART NO.|
* ROTARY TEST SWITCH IN PRIM, SEC,     *|-------------------------------|
* DUCT1, DUCT2 POSITIONS               *| MULTIMETER                    |
* GR1 WARNING LIGHTS DO NOT COME ON    *-------------------------------
R * NO MASTER WARNING IN PRIM POSITION *
* THE FOUR FUEL WARNING LIGHTS COME    *
* ON (ROTARY TEST SWITCH IN FUEL       *
* POSITION).                           *
* GROUP 2,3,4 WARNING LIGHTS COME ON   *
****************************************
************************************************
* Open door 123AB. In unit 14-123, check diode *
* 1H675. The diode is :                        *
************************************************
   ||               |
   ||               |                  ------------------------------
   OK               |------NOT OK-------| Replace diode 1H675 [27]   |
   ||                                  ------------------------------
   ||
   ||                                  ------------------------------
   ||-----------------------------------| Replace relay 1H676 [28]   |
                                       ------------------------------
```

	RELAY	UNIT	DIODE	LOCATION
GR1	1H676	14-123	1H675	14-123
GR2	2H676	14-123	2H675	14-123
GR3	3H676	12-123	3H675	12-123
GR4	4H676	17-123	4H675	17-123

Chart 108

```
*************************************-------------------------------
* AIR COND TEST SWITCH IN TEST      *| GROUND EQUIPMENT REQUIRED   |
* POSITION.ROTARY TEST SWITCH IN PRIM*|-----------------------------|
* POSITION.                         *| DESCRIPTION        PART NO. |
*                                   *|-----------------------------|
* PRIM EXCH 2,3,4 WARNING LIGHTS ARE *| MULTIMETER                  |
* ILLUMINATED.                      *-------------------------------
* PRIM EXCH 1 WARNING LIGHT IS      *
* EXTINGUISHED.                     *
* (IF GROUP 1 IS FAILED : NO MASTER *
* WARNING).                         *
*************************************
*********************************************************
* Place COND VALVE switch in ON position                *
* Remove overheat safety box 1H649 [15].                *
* On connector 1H649A, measure the resistance between   *
* terminal 57 and 47. Resistance : 110 ohms approximately*
*********************************************************
  ||                    |
  ||                    |    ---------------------------------------
  YES                   |-NO-| Replace overheat detector 1H654 [16].|
  ||                         ---------------------------------------
  ||
***********************************************
* On connector 1H649A, measure voltage between *
* terminal 5 and the ground                    *
***********************************************
  ||                    |
  ||                    |    ---------------------------------------
  28V                   |-OV-| Replace rotary test switch H648 [14].|
  ||                         ---------------------------------------
  ||
  ||
```

Chart 109 (Sheet 1 of 2)

```
  ||
*****************************************************
* On connector 1H649-A, measure continuity between  *
* terminal 14 and the ground.                       *
*****************************************************
      ||              |
      ||              |                  ------------------------------
  Continuity          |=Discontinuity-| Replace diode 1H639 [8].     |
      ||                                 ------------------------------
*****************************************************
* On connector 1H649-A, install a shunt between     *
* terminal 24 and the aircraft ground               *
* PRIM EXCH 1 and AIR warning lights come on (the   *
* latter comes on only if group 1 is failed).       *
*****************************************************
        ||            |
        ||            |                  ------------------------------
        YES           |---NO----------| Replace relay 1H620 [3].     |
        ||                               ------------------------------
        ||
        ||                               ------------------------------
        ||                              | Replace overheat safety      |
        ||-----------------------------| box 1H649 [15].              |
                                         ------------------------------
```

Chart 109 (Sheet 2 of 2)

```
**************************************-------------------------------
* AIR COND TEST SWITCH IN TEST       *| GROUND EQUIPMENT REQUIRED  |
* POSITION.                          *|----------------------------|
* ROTARY TEST SWITCH IN SEC          *| DESCRIPTION       PART NO. |
* POSITION                           *|----------------------------|
*                                    *| MULTIMETER                 |
* SEC EXCH 2,3,4 WARNING LIGHTS      *-------------------------------
* ILLUMINATED.                       *
* SEC EXCH 1 WARNING LIGHT IS        *
* EXTINGUISHED.                      *
* (IF GROUP 2 IS FAILED : NO MASTER  *
* WARNING).                          *
**************************************
*****************************************************
R * Place COND VALVE switch 1H866 in ON position      *
* Remove overheat safety box 1H649 [15].            *
* On connector 1H649-A, measure the resistance      *
* between terminals 55 and 45. Resistance is        *
* 110 ohms approximately.                           *
*****************************************************
  ||                 |       ----------------------------------------
  YES                |--NO---| Replace overheat detector 1H655 [17] |
  ||                         ----------------------------------------
*****************************************************
* On connector 1H649-A, measure voltage between     *
* terminal 6 and the ground.                        *
*****************************************************
  ||                 |       ----------------------------------------
  28V                |---0V--| Replace rotary test switch H648 [14] |
  ||                         ----------------------------------------
  ||
  ||
```

Chart 110 (Sheet 1 of 2)

```
**************************************************
* On connector 1H643A, measure continuity between*
* terminal 14 and aircraft ground.               *
**************************************************
  ||                      |
  ||                      |                    ------------------------------
 CONTINUITY               |DISCONTINUITY-| Replace diode 1H640 [9].    |
  ||                                           ------------------------------
  ||
**************************************************
* On connector 1H649-A, install a shunt between  *
* terminal 25 and aircraft ground.               *
* SEC EXCH 1 warning light comes on              *
* (AIR warning light comes on on master warning  *
* panel if group 2 is failed).                   *
**************************************************
  ||                      |                    ------------------------------
  YES                     |--NO----------| Replace relay 1H621 [4].    |
  ||                                           ------------------------------
  ||
  ||                                           ------------------------------
  ||                                           | Replace overheat safety   |
  ||-----------------------------------| box 1H649 [15].           |
                                               ------------------------------
```

Chart 110 (Sheet 2 of 2)

```
***********************************-----------------------------
* AIR COND TEST SWITCH IN TEST       *| GROUND EQUIPMENT REQUIRED |
* POSITION.                          *|---------------------------|
* ROTARY TEST SWITCH IN DUCT 1 AND   *| DESCRIPTION       PART NO. |
* DUCT 2 POSITION.                   *|---------------------------|
* GROUP 2,3,4 WARNING LIGHTS ARE     *| MULTIMETER                |
* ILLUMINATED.                       *-----------------------------
* GROUP 1 DUCT WARNING LIGHT IS      *
* EXTINGUISHED.                      *
**************************************
****************************************************
* In zone 123, in unit 7-123, check diode 1H689.   *
* Diode is correct                                 *
****************************************************
  ||                                |     -------------------------------
  YES                               |-NO-| Replace diode 1H689 [36].    |
  ||                                      -------------------------------
  ||                                      -------------------------------
  ||-------------------------------------| Replace relay 1H623 [5].     |
                                          -------------------------------
```

	DIODE	ACCESS	RELAY	ACCESS
GR1	1H689	7-123	1H623	14-123
GR2	2H689	7-123	2H623	14-123
GR3	3H689	8-123	3H623	17-123
GR4	4H689	8-123	4H623	17-123

Chart 111

```
*************************************-----------------------------
* AIR COND TEST SWITCH IN TEST      *| GROUND EQUIPMENT REQUIRED |
* POSITION.                         *|---------------------------|
* ROTARY TEST SWITCH IN DUCT 1      *| DESCRIPTION      PART NO. |
* POSITION                          *|---------------------------|
* GROUP 2,3,4 DUCT WARNING LIGHTS ARE*| MULTIMETER               |
* ILLUMINATED                       *-----------------------------
* GROUP 1 DUCT WARNING LIGHT IS     *
* EXTINGUISHED.                     *
* (IF GROUP 3 IS FAILED : NO MASTER *
* WARNING).                         *
*************************************
***************************************************
* Place COND VALVES switch in ON position.        *
* Place rotary test switch in DUCT1 position      *
* Place AIR COND TEST switch in TEST position     *
* Remove overheat safety box 1H649 [15]           *
* On connector 1H649-A, measure resistance between *
* terminal 41 and 51. Resistance is 110 ohms      *
* approximately.                                  *
***************************************************
  ||                              |    ============================
  ||                              |    | Replace overheat detector |
  YES                             |-NO-| 1H657 [19]                |
  ||                                   ----------------------------
***************************************************
* On connector 1H649-A, measure voltage between   *
* terminal 8 and the ground                       *
***************************************************
  ||                              |    ----------------------------
  ||                              |    | Replace rotary test switch |
  28V                             |-OV-| H648 [14]                 |
  ||                                   ----------------------------
  ||
```

Chart 112 (Sheet 1 of 2)

```
************************************************
* Place rotary test switch in DUCT 2 position  *
* The sequence is correct.                     *
************************************************
  ||                               |
  ||                               |      -----------------------------
  YES                              |-NO-| Ref. Chart 111              |
  ||                                    -----------------------------
  ||
  ||                                    -----------------------------
  ||-----------------------------------| Replace diode 1H642 [10].   |
                                        -----------------------------
```

Chart 112 (Sheet 2 of 2)

Printed in England

```
***************************************=============================
* AIR COND TEST SWITCH IN TEST        *| GROUND EQUIPMENT REQUIRED  |
* POSITION.                           *|----------------------------|
* ROTARY TEST SWITCH IN DUCT2         *| DESCRIPTION       PART NO. |
* POSITION                            *|----------------------------|
*                                     *| MULTIMETER                 |
* GROUP 2,3,4 DUCT WARNING LIGHTS     *-----------------------------
* ILLUMINATED.                        *
* GROUP 1 DUCT WARNING LIGHT          *
* EXTINGUISHED.                       *
* (IF GROUP 4 IS FAILED : NO MASTER   *
* WARNING).                           *
***************************************

************************************************
* Place COND VALVES switch in ON position      *
* Place rotary test switch in DUCT2 position   *
* Place AIR COND TEST switch in TEST position  *
* Remove overheat safety box 1H649 [15]        *
* On connector 1H649-A, measure the resistance *
* between terminals 49 and 32. The resistance  *
* is 110 ohms approximately.                   *
************************************************
  ||              |        ---------------------------------------
  YES             |---NO----| Replace overheat detector 1H658 [20] |
  ||                       ---------------------------------------
************************************************
* On connector 1H649-A, measure voltage between *
* terminal 9 and aircraft ground.              *
************************************************
  ||              |        ---------------------------------------
  28V             |--OV-----| Replace rotary test switch H648 [14] |
  ||                       ---------------------------------------
  ||
```

Chart 113 (Sheet 1 of 2)

Printed in England

```
  ||
*************************************************
* Place rotary test switch in DUCT1 position.   *
* The sequence is correct.                      *
*************************************************
  ||                    |
  ||                    |      -----------------------------------
  YES                   |--NO-----| Ref. Chart 111                  |
  ||                               -----------------------------------
  ||
  ||                               -----------------------------------
  ||-----------------------------| Replace diode 1H643 [11].       |
                                   -----------------------------------
```

Chart 113 (Sheet 2 of 2)

```
**************************************-------------------------------
* AIR COND TEST SWITCH IN TEST       *| GROUND EQUIPMENT REQUIRED   |
* POSITION.                          *|-----------------------------|
* ROTARY TEST SWITCH IN PRIM OR SEC  *| DESCRIPTION        PART NO. |
* POSITION                           *|-----------------------------|
* GR1 PRIM OR SEC WARNING LIGHTS     *| MULTIMETER                  |
* DO NOT COME ON.                    *-------------------------------
* AIR WARNING LIGHT COMES ON ON      *
* MASTER WARNING PANEL.              *
* AURAL WARNING SOUNDS.              *
**************************************

***************************************************
* In zone 123 in unit 14-123, remove relay 1H614. *
* On relay, check continuity between terminals    *
* A2 and A3.                                      *
***************************************************
       ||        |
       ||        |                  ----------------------------------
    Continuity   |Discontinuity-| Replace relay 1H614 [1].          |
       ||                         ----------------------------------
       ||
       ||                         ----------------------------------
       ||-----------------------| Replace relay 1H619 [2].          |
                                  ----------------------------------
```

	RELAY		ACCESS
GR1	1H614	1H619	14-123
GR2	2H614	2H619	14-123
GR3	3H614	3H619	17-123
GR4	4H614	4H619	17-123

Chart 114

```
*************************************-------------------------------
* COND VALVE SWITCH IN OPEN POSITION *| GROUND EQUIPMENT REQUIRED  |
* NORMAL INDICATION ON MASS FLOW     *|----------------------------|
* INDICATOR.                         *| DESCRIPTION       PART NO. |
* AIR COND TEST SWITCH IN COND       *|----------------------------|
* POSITION.                          *| MULTIMETER                 |
* COND VALVE MAGNETIC INDICATOR      *-------------------------------
* DISPLAYS OPEN.                     *
* MASS FLOW INDICATOR INDICATES ZERO.*
*************************************
**********************************************************
* Disconnect connector 1H645-A from air conditioning valve  *
* [12]. Measure voltage between C and D and E and F.        *
**********************************************************
   ||                 |    ***************************************
   28V               0V    * Measure voltage at the output of    *
   ||                 |----* circuit breaker 1H667 [24].         *
   ||                      ***************************************
   ||                        ||   |
   ||                       28V  0V    -------------------------------
   ||                        ||   |----| Replace circuit breaker     |
   ||                        ||        | 1H667 [24].                 |
   ||                        ||        -------------------------------
   ||                        ||        -------------------------------
   ||                        ||--------| Replace relay 1H676 [28].   |
   ||                                  -------------------------------
   ||
   ||                                  -------------------------------
   ||                                  | Replace air conditioning    |
   ||----------------------------------| valve 1H645 [12].           |
                                       -------------------------------
```

Chart 115 (Sheet 1 of 2)

	CONNECTOR	TERMINAL	ACCESS
GR1	UT1811	1A	14-123
GR2	UT1809	6A	14-123
GR3	UT1812	1A	17-123
GR4	UT1810	1A	17-123

Chart 115 (Sheet 2 of 2)

```
*************************************------------------------------
* COND VALVE SWITCH IN ON POSITION   *| GROUND EQUIPMENT REQUIRED |
* MASS FLOW INDICATOR INDICATES NOR- *|---------------------------|
* MAL. AIR COND TEST SWITCH IN TEST  *| DESCRIPTION      PART NO. |
* POSITION ROTARY TEST SWITCH IN COND*|---------------------------|
* POSITION COND VALVE MAGNETIC       *| MULTIMETER                |
* INDICATOR                          *-----------------------------
* DISPLAYS SHUT AFTER A LAPSE OR 20' *
* MASS FLOW INDICATOR INDICATES ZERO *
**************************************
****************************************************
* Disconnect connector 1H645-A from air conditioning*
* valve 1H645 [12]. Measure voltage between          *
* terminals E and F.                                 *
****************************************************
      ||                        |
      ||                        |         ----------------------------
      28V                       0V---| Replace relay 1H614 [1].    |
      ||                                  ----------------------------
      ||
      ||                                  ----------------------------
      ||----------------------------| Replace air conditioning    |
                                     | valve 1H645 [12].           |
                                          ----------------------------
```

Chart 116

```
**************************************-------------------------------
* COND VALVE MAGNETIC INDICATOR      *| GROUND EQUIPMENT REQUIRED  |
* DISPLAYS OPEN.                     *|----------------------------|
* MASS FLOW INDICATOR INDICATES NOR- *| DESCRIPTION       PART NO. |
* MAL. AIR COND TEST SWITCH IN TEST  *|----------------------------|
* POSITION.                          *| MULTIMETER                 |
* ROTARY TEST SWITCH IN FLOW POSITION*------------------------------
* MASS FLOW INDICATOR REMAINS IN     *
* NORMAL POSITION.                   *
**************************************

*************************************************
* Place AIR COND TEST switch in TEST position   *
* Rotary test switch is placed in FLOW position *
* Disconnect connector 1H880-A from mass flow   *
* control valve 1H880 [44]; measure voltage     *
* between terminals A and B.                    *
*************************************************
  ||         |    **********************************************
  ||         |    * In zone 123, on front face of unit 7-123, on   *
  ||         |-OV-* test connector UT1891, measure voltage between *
  ||              * terminal 5A and the ground.                    *
  ||              **********************************************
  ||                 ||      |    ----------------------------------
  ||                 28V     |-OV-| Replace relay 1H906 [47].      |
  ||                 ||           ----------------------------------
  ||              **********************************************
  ||              * In zone 123, on front face of unit 14-123, on  *
  ||              * test connector UT1811, measure voltage between *
  ||              * terminal 1A and the ground.                    *
  ||              **********************************************
  ||                 ||      |    *********************************
  ||                 ||      |    * On test connector UT1811,measure*
  28V                28V     |-OV-* voltage between terminal 6C     *
  ||                 ||           * and the ground                  *
  ||                 ||           *********************************
  ||                 ||             ||   |    ************************
  ||                 ||             ||   |    * In zone 123, in unit  *
  ||                 ||             28V  |-OV-* 14-123, check diode    *
  ||                 ||             ||        * 1H638 [7]. The diode   *
  ||                 ||             ||        * is correct.            *
  ||                 ||             ||        ************************
  ||                 ||             ||           ||             |
  ||                 ||             ||           ||             |
  ||                 ||             ||           ||             |
  ||                 ||             ||           YES            NO
  ||                 ||             ||           ||             |
```

Chart 117 (Sheet 1 of 2)

```
 ||                    ||           ||           YES             NO
 28V                   28V          28V          ||  ------------------
 ||                    ||           ||           ||  | Replace diode   |
 ||                    ||           ||           ||  | 1H638 [7]       |
 ||                    ||           ||           ||  ------------------
 ||                    ||           ||           ||  ------------------
 ||                    ||           ||           ||  | Replace rotary  |
 ||                    ||           ||           ||-| test switch H648|
 ||                    ||           ||               | [14]            |
 ||                    ||           ||               ------------------
 ||                    ||         **********************************|
 ||                    ||         * In unit 14-123, check diode      |
 ||                    ||         * 1H674 [26].                      |
 ||                    ||         **********************************|
 ||                    ||          ||   |          ---------------------
 ||                    ||          OK   |-NOT OK--| Replace relay      |
 ||                    ||          ||             | 1H676 [28]         |
 ||                    ||          ||             ---------------------
 ||                    ||          ||             ---------------------
 ||                    ||          ||-------------| Replace diode      |
 ||                    ||                         | 1H674 [26]         |
 ||                    ||                         ---------------------
 ||                    ||                  ------------------------------
 ||                    ||------------------| Replace diode 1H675 [27]   |
 ||                                        ------------------------------
 ||                                        ------------------------------
 ||                                        | Replace mass flow control  |
 ||----------------------------------------| valve 1H880 [44].          |
                                           ------------------------------
```

	Conn	Pin	Panel	Conn	Pin	Panel	Conn	Pin	Panel
GR 1	UT1891	5A	7-123	UT1811	1A	14-123	UT1811	6C	14-123
GR 2	UT1893	5A	7-123	UT1809	6A	14-123	UT1809	6C	14-123
GR 3	UT1890	4A	8-123	UT1812	1A	17-123	UT1812	6C	17-123
GR 4	UT1892	5A	8-123	UT1810	1A	17-123	UT1810	6C	17-123

Chart 117 (Sheet 2 of 2)

```
**************************************-------------------------------
* COND VALVE SWITCH IN ON POSITION   *| GROUND EQUIPMENT REQUIRED   |
* AIR COND TEST SWITCH IN TEST       *|-----------------------------|
* POSITION.                          *| DESCRIPTION        PART NO. |
* ROTARY TEST SWITCH IN PRIM POSITION*|-----------------------------|
* PRIM EXCH WARNING LIGHTS ARE       *| MULTIMETER                  |
* ILLUMINATED.                       *-------------------------------
* MASTER WARNING DOES NOT OPERATE    *
**************************************

*****************************************************
* In zone 216 open door to gain access to shelf 7-216 *
* on test connector W272, install a shunt between     *
* terminal 56 and the ground.                         *
* In flight compartment, AIR warning light comes on   *
* on master warning panel.                            *
*****************************************************
    ||                          |     ------------------------------
    ||                          |    | Replace master warning       |
    YES                         |-NO-| panel W272.                  |
    ||                          |    | Ref. WDM 33-15-03            |
    ||                               ------------------------------
    ||
*****************************************************
* At Flight Engineer's station, remove AIR COND TEST *
* panel 23-214 ; disconnect connect U2252A. On        *
* unit side, check continuity between terminals 15    *
* and 16 of connector U2252B.                         *
*****************************************************
    ||                          |     ------------------------------
 CONTINUITY              DISCONTINUITY | Replace rotary test switch |
    ||                          |----| H648 [14]                    |
    ||                                ------------------------------
*********************************************
* In unit 14-123, remove relay 1H901 and check *
* continuity between terminals D2 and D3.      *
*********************************************
    ||                          |     ------------------------------
 CONTINUITY              DISCONTINUITY--| Replace relay 1H901 [46]  |
    ||                                ------------------------------
    ||
    ||                                ------------------------------
    ||--------------------------------| Replace relay 1H620 [3]     |
                                      ------------------------------
```

Chart 118

```
**************************************-------------------------------
* COND VALVE SWITCH IN ON POSITION   *| GROUND EQUIPMENT REQUIRED  |
* AIR COND TEST SWITCH IN TEST       *|-----------------------------|
* POSITION.                          *| DESCRIPTION        PART NO. |
* ROTARY TEST SWITCH IN SEC POSITION *|-----------------------------|
* SEC EXCH WARNING LIGHTS ILLUMINATED*| MULTIMETER                  |
* MASTER WARNING DOES NOT OPERATE    *-------------------------------
**************************************
*****************************************************
* In zone 216,open door to gain access to shelf 7-216*
* On test connector W273, install a shunt between    *
* terminal 46 and the ground.                        *
* In flight compartment, AIR warning light comes on  *
* on master warning panel.                           *
*****************************************************
    ||                      |         ------------------------------
    ||                      |        | Replace master warning       |
   YES                      |---NO----| panel W272.                  |
    ||                      |        | Ref. WDM 33-15-03            |
    ||                                ------------------------------
*****************************************************
* In flight compartment, remove AIR COND TEST panel  *
* 23-214 ; disconnect connector U2253A. On unit side,*
* check continuity between terminals 15 and 16.      *
*****************************************************
    ||                      |         ------------------------------
    ||                      |        | Replace rotary test switch   |
   YES                      |---NO----[ H648 [14].                   |
    ||                                ------------------------------
***********************************************
* In unit 14-123, remove relay 2H901 and check *
* continuity between terminals D2 and D3.      *
***********************************************
    ||             |                  ------------------------------
 Continuity        |-Discontinuity-----| Replace relay 2H901 [46]    |
    ||                                ------------------------------
    ||
    ||                                ------------------------------
    ||---------------------------------| Replace relay 2H621 [4].    |
                                      ------------------------------
```

Chart 119

```
*************************************-------------------------------
* COND VALVE SWITCH IN ON POSITION   *| GROUND EQUIPMENT REQUIRED    |
* AIR COND TEST SWITCH IN TEST       *|------------------------------|
* POSITION.                          *| DESCRIPTION        PART NO.  |
* ROTARY TEST SWITCH IN DUCT 1       *|------------------------------|
* POSITION.                          *| MULTIMETER                   |
* DUCT WARNING LIGHTS ILLUMINATED    *-------------------------------
* NO MASTER WARNING.                 *
*************************************
*********************************************************
* In zone 216 open door to gain access to shelf 7-216   *
* On test connector W274, install a shunt between       *
* terminal 51 and aircraft ground.                      *
* In flight compartment, AIR warning light comes on     *
* on master warning panel.                              *
*********************************************************
    ||                           |     ------------------------------
    ||                           |     | Replace master warning      |
    YES                          |-NO-| panel W274.                 |
    ||                           |     | Ref. WDM 33-15-03           |
    ||                                 ------------------------------
**********************************************************
* In flight compartment, remove AIR COND TEST panel 23-214*
* Disconnect connector U2254A. On unit side, check       *
* continuity between terminals 15 and 16 of connector    *
* U2254B.                                                *
**********************************************************
    ||                           |     ------------------------------
    ||                           |     | Replace rotary test switch |
    YES                          |-NO-| H648 [14].                  |
    ||                                 ------------------------------
*****************************************************
* In unit 14-123, remove relay 3H901 [46] and check *
* continuity between terminals D2 and D3.           *
*****************************************************
    ||                           |     ------------------------------
    YES                          |-NO-| Replace relay 3H901 [46]    |
    ||                                 ------------------------------
    ||
    ||                                 ------------------------------
    ||--------------------------------| Replace relay 3H623 [5]     |
                                       ------------------------------
```

Chart 120

```
**************************************-----------------------------
* COND VALVE SWITCH IN ON POSITION   *| GROUND EQUIPMENT REQUIRED  |
* AIR COND TEST SWITCH IN TEST       *|----------------------------|
* POSITION.                          *| DESCRIPTION        PART NO.|
* ROTARY TEST SWITCH IN DUCT 2       *|----------------------------|
* POSITION.                          *| MULTIMETER                 |
* DUCT WARNING LIGHTS ILLUMINATED    *-----------------------------
* NO MASTER WARNING.                 *
**************************************
**********************************************************
* In zone 216 open door to gain access to shelf 7-216    *
* On test connector W275, install a shunt between        *
* terminal 51 and ground.                                *
* In flight compartment, AIR warning light comes on      *
* on master warning panel.                               *
**********************************************************
    ||                                  |     ------------------------------
    ||                                  |     | Replace master warning     |
    YES                                 |-NO-| panel W275.                |
    ||                                        | Ref. WDM 33-15-03          |
    ||                                        ------------------------------
***********************************************************
* In flight compartment, remove AIR COND TEST panel 23-214*
* Disconnect connector U2254A. Check continuity between   *
* terminals 15 and 16 from connector U2255B.              *
***********************************************************
    ||                    |                   ------------------------------
    ||                    |                   | Replace rotary test switch |
 Continuity               Discontinuity--| H648 [14]                  |
    ||                                        ------------------------------
***********************************************************
* In unit 14-123, remove relay 4H901 [46] and check       *
* continuity between terminals D2 and D3.                 *
***********************************************************
    ||                    |                   ------------------------------
 Continuity               Discontinuity--| Replace relay 4H901 [46]   |
    ||                                        ------------------------------
    ||                                        ------------------------------
    ||-----------------------------------| Replace relay 4H623 [5]    |
                                              ------------------------------
```

Chart 121

```
***************************************--------------------------------
* AIR COND TEST SWITCH IN TEST       *| GROUND EQUIPMENT REQUIRED     |
* POSITION.                          *|-------------------------------|
* ROTARY TEST SWITCH IN PRIM POSITION*| DESCRIPTION         PART NO.  |
* ROTARY TEST SWITCH IN SEC POSITION *|-------------------------------|
* THE CORRESPONDING WARNING LIGHTS   *| MULTIMETER                    |
* COME ON.                           *---------------------------------
* SMOKE ROTARY TEST SWITCH IN TEST   *
* POSITION                           *
* THE FOUR SMOKE WARNING LIGHTS ARE  *
* ILLUMINATED.                       *
* DUCT WARNING LIGHT IS ILLUMINATED. *
***************************************

*********************************************************
* In flight compartment, open AIR COND TEST panel 23-214 *
* Inside unit 23-214, check diode 1H642 [10]            *
* Diode is correct.                                     *
*********************************************************
    ||                              |
    ||                              |  ---------------------------
   YES                              |NO-| Replace diode 1H642 [10] |
    ||                                 ---------------------------
    ||
    ||                                 ---------------------------
    ||---------------------------------| Replace diode 1H643 [11] |
                                       ---------------------------
```

Chart 122

* BLEED VALVE SWITCH IN OPEN POSITION
* PRESS DUCT1 WARNING LIGHT
* AIR WARNING LIGHT DOES NOT COME ON
* NO AURAL WARNING.
* DUCT1 WARNING LIGHT EXTINGUISHED.

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	

In flight compartment, on AIR BLEED CONTROL panel, press DUCT1 warning light ; hold it pressed and in zone 123, on unit 7-123, on test connector UT1891 measure voltage between terminal 10C and the ground.

- 28V → Replace relay 1H686 [33]
- 0V → Replace DUCT warning light 1H629 [6].

	CONN	TERM	ACCESS	WRN LT	ACCESS	RELAY	ACCESS
GR 1	UT1891	10C	7-213	1H629	2-214	1H686	7-123
GR 2	UT1893	10C	7-213	2H629	2-214	2H686	7-123
GR 3	UT1890	10C	8-213	3H629	2-214	3H686	8-123
GR 4	UT1892	10C	8-213	4H629	2-214	4H686	8-123

Chart 123

```
**************************************---------------------------------
* BLEED VALVE SWITCH IN OPEN POSITION*| GROUND EQUIPMENT REQUIRED     |
* PRESS DUCT1 WARNING LIGHT          *|-------------------------------|
* AIR WARNING LIGHT COMES ON ON      *| DESCRIPTION         PART NO.  |
* MASTER WARNING PANEL.              *|-------------------------------|
* ASSOCIATED AURAL WARNING SOUNDS    *| MULTIMETER                    |
* DUCT1 WARNING LIGHT GOES OFF.      *---------------------------------
**************************************
******************************************************
* On AIR BLEED CONTROL panel press DUCT warning light*
* Make certain that cabin isolation valve 1H678 [29] *
* operates correctly.                                *
******************************************************
    ||      |    *****************************************
    ||      |    * On cabin isolation valve 1H678 [29]        *
    ||      |    * Disconnect electrical connector 1H678-A    *
    YES     |-NO-* In flight compartment, press DUCT warning light*
    ||           * on electrical connector 1H678A, measure voltage*
    ||           * between terminals B and C and C and D      *
    ||           *****************************************
    ||            28V    28V     0V  -----------------------------
    ||            CD     BC      BC  | Replace circuit breaker    |
    ||            ||     ||      CD--| 1H860 [31].                |
    ||            ||     ||          -----------------------------
    ||            ||    ***************************************
    ||            ||    * In zone 123, in unit 14-123, check diode *
    ||            ||    * 1H710 [41]. Diode is correct.            *
    ||            ||    ***************************************
    ||            ||     ||  |       -----------------------------
    ||            ||     OK  |-NOT OK--| Replace diode 1H710 [41] |
    ||            ||     ||          -----------------------------
    ||            ||     ||
    ||            ||     ||          -----------------------------
    ||            ||     ||----------| Replace relay 1H682 [32]   |
    ||            ||                 -----------------------------
    ||            ||
    ||            ||                 -----------------------------
    ||            ||-----------------| Replace cabin isolation    |
    ||                               | valve 1H678 [29]           |
    ||                               -----------------------------
    ||
```

Chart 124 (Sheet 1 of 2)

```
    ||
*****************************************************
* On cabin isolation valve 1H678 [29], disconnect   *
* electrical connector 1H678A. Install a shunt      *
* between terminal D and E. Press DUCT warning      *
* light, it comes on.                               *
*****************************************************
    ||        |
    ||        |    *********************************************
   YES        |-NO-* In flight compartment, open panel 2-214 and    *
    ||             * check diode 1H706. The diode is correct.       *
    ||             *********************************************
    ||                  ||     |
    ||                  ||     |     -----------------------------------
    ||                 YES     |--NO-| Replace diode 1H706 [39].        |
    ||                  ||           -----------------------------------
    ||                  ||
    ||                  ||           -----------------------------------
    ||                  ||           | Replace engine shut down handle |
    ||                  ||-----------| 1W160 [49]                      |
    ||                               | Ref. WDM 26-22-01               |
    ||                               -----------------------------------
    ||
    ||                               -----------------------------------
    ||                               | Replace cabin isolation valve   |
    ||-------------------------------| 1H678 [29].                     |
                                     -----------------------------------
```

	VALVE	CONNECTOR	C/B	DIODE	RELAY
GR 1	1H678	1H678A	1H680	1H710	1H682
GR 2	2H678	2H678A	2H680	2H710	2H682
GR 3	3H678	3H678A	3H680	3H710	3H682
GR 4	4H678	4H678A	4H680	4H710	4H682

Chart 124 (Sheet 2 of 2)

```
***************************************-------------------------------
* BLEED VALVE SWITCH IN OPEN POSITION*| GROUND EQUIPMENT REQUIRED  |
* PRESS DUCT1 WARNING LIGHT. IT COMES*|----------------------------|
* ON.                                *| DESCRIPTION       PART NO. |
* RELEASE DUCT1 WARNING LIGHT. IT    *|----------------------------|
* GOES OFF IMMEDIATELY.              *| MULTIMETER                 |
***************************************-------------------------------


**************************************************
* At Flight Engineer's station, open AIR BLEED   *
* CONTROL panel.                                 *
* On DUCT warning light, measure voltage between *
* terminal C and the ground.                     *
**************************************************
    ||                            |
    ||                            |  ------------------------------
   28V                            |-0V-| Replace warning light    |
    ||                                 | 1H629 [6].               |
    ||                                 ------------------------------
    ||
    ||                                 ------------------------------
    ||---------------------------------| Replace relay 1H687 [34] |
                                       ------------------------------
```

	Caption lt	Access	Relay	Access
GR 1	1H629	2-214	1H687	7-123
GR 2	2H629	2-214	2H687	7-123
GR 3	3H629	2-214	3H687	8-123
GR 4	4H629	2-214	4H687	8-123

Chart 125

```
**************************************-----------------------------------
* BLEED VALVE SWITCH IN OPEN POSITION*| GROUND EQUIPMENT REQUIRED       |
* RELEASE DUCT1 WARNING LIGHT        *|---------------------------------|
* IT COMES ON.                       *| DESCRIPTION          PART NO.   |
**************************************-----------------------------------

*****************************************************
* On cabin isolation valve 1H678 [29], check position*
* of visual position indicator which indicates :    *
*****************************************************
   ||     |
   ||     |         *********************************************
   ||     |         * On cabin isolation valve 1H678 [29], disconnect*
  OPEN    |-Closed--* connector 1H678A. Measure voltage between   *
   ||               * terminal B and C.                           *
   ||               *********************************************
   ||                   ||      |
   ||                   ||      |      -----------------------------------
   ||                   28V     |-0V-| Replace relay 1H682 [32].         |
   ||                   ||             -----------------------------------
   ||                   ||
   ||                   ||             -----------------------------------
   ||                   ||-----------| Replace cabin isolation valve     |
   ||                                | 1H678 [29].                       |
   ||                                 -----------------------------------
   ||
*********************************************
* In zone 123, on unit 7-123, measure voltage  *
* between terminal 9C of connector UT1891 and  *
* the ground.                                  *
*********************************************
   ||                         |
   ||                         |      -----------------------------------
   ||                         |     | Replace cabin isolation valve     |
   28V                        |-0V-| 1H678 [29].                        |
   ||                                -----------------------------------
   ||                                -----------------------------------
   ||-------------------------------| Replace relay 1H687 [34].         |
                                     -----------------------------------
```

Chart 126 (Sheet 1 of 2)

	VALVE	CONN	PIN	ACCESS
GR 1	1H648	UT1891	9C	7-123
GR 2	2H648	UT1893	9C	7-123
GR 3	3H648	UT1890	9C	8-123
GR 4	3H648	UT1892	9C	8-123

Chart 126 (Sheet 2 of 2)

GR1 AND GR2 CROSS BLEED MAGNETIC INDICATORS DISPLAY OPEN.
GR2 DUCT WARNING LIGHT IS PRESSED AND ILLUMINATED.
GR1 CROSS BLEED MAGNETIC INDICATOR DISPLAYS OPEN.
GR2 CROSS BLEED MAGNETIC INDICATOR DISPLAYS SHUT

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	

In zone 123, in unit 7-123, check that diode 2H3146 [48] is correct.

- NO: Replace diode 2H3146 [48]
- YES: Replace relay 2H707 [40]

	Relay	Diode
GR 1	2H707	2H3146
GR 2	1H707	1H3146
GR 3	4H707	4H3146
GR 4	3H707	3H3146

Chart 127

```
***************************************-------------------------------
* GR1 AND GR2 CROSS BLEED MAGNETIC    *| GROUND EQUIPMENT REQUIRED  |
* INDICATORS DISPLAY OPEN.            *|----------------------------|
* GR1 DUCT WARNING LIGHT PRESSED AND  *| DESCRIPTION       PART NO. |
* ILLUMINATED.                        *|----------------------------|
* GR1 CROSS BLEED MAGNETIC INDICATOR  *| MULTIMETER                 |
* DISPLAYS SHUT.                      *-------------------------------
* GR2 CROSS BLEED MAGNETIC INDICATOR  *
* DISPLAYS OPEN.                      *
***************************************
******************************************************
* In zone 123, in unit 7-123, check diode 1H3146 [48]*
* Diode is correct.                                  *
******************************************************
    ||                               |
    ||                               |    ------------------------------
   YES                               |-NO-| Replace diode 1H3146 [48]  |
    ||                                    ------------------------------
    ||
    ||                                    ------------------------------
    ||------------------------------------| Replace relay 1H707 [40]   |
                                          ------------------------------
```

	RELAY	DIODE
GR 1	2H707	2H1346
GR 2	1H707	1H1346
GR 3	4H707	4H1346
GR 4	3H707	3H1346

Chart 128

```
**************************************-------------------------------
* GR3 AND GR4 MAGNETIC INDICATOR      *| GROUND EQUIPMENT REQUIRED  |
* IN OPEN POSITION.                   *|----------------------------|
* GR4 DUCT WARNING LIGHT PRESSED AND  *| DESCRIPTION      PART NO.  |
* ILLUMINATED.                        *|----------------------------|
* GR3 CROSS BLEED MAGNETIC INDICATOR  *| MULTIMETER                 |
* DISPLAYS OPEN.                      *-----------------------------
* GR4 CROSS BLEED MAGNETIC INDICATOR  *
* DISPLAYS SHUT.                      *
**************************************


******************************************************
* In zone 123,in unit 8-123, check diode 4H3146 [48].*
* the diode is correct.                              *
******************************************************
    ||                             |
    ||                             |   ------------------------------
   YES                             |-NO-| Replace diode 4H3146 [48]  |
    ||                                 ------------------------------
    ||
    ||                                 ------------------------------
    ||---------------------------------| Replace relay 4H707 [40]   |
                                       ------------------------------
```

	RELAY	DIODE
GR 1	2H707	2H1346
GR 2	1H707	1H1346
GR 3	4H707	4H1346
GR 4	3H707	3H1346

Chart 129

```
*************************************=-----------------------------
* GR3 AND GR4 CROSS BLEED MAGNETIC   *| GROUND EQUIPMENT REQUIRED  |
* INDICATORS DISPLAY OPEN            *|----------------------------|
* GR3 DUCT WARNING LIGHT PRESSED AND *| DESCRIPTION       PART NO. |
* ILLUMINATED.                       *|----------------------------|
* GR3 CROSS BLEED MAGNETIC INDICATOR *| MULTIMETER                 |
* DISPLAYS SHUT.                     *------------------------------
* GR4 CROSS BLEED MAGNETIC INDICATOR *
* DISPLAYS OPEN.                     *
**************************************

******************************************************
* In zone 123, in unit 8-123, check diode 3H146 [48].*
* The diode is correct.                              *
******************************************************
   ||                  |
   ||                  |          ----------------------------
   ||                  |---------| Replace diode 3H3146 [48]. |
   ||                             ----------------------------
   ||
   ||                             ----------------------------
   ||----------------------------| Replace relay 3H707 [40].  |
                                  ----------------------------
```

	RELAY	DIODE
GR 1	2H707	2H1346
GR 2	1H707	1H1346
GR 3	4H707	4H1346
GR 4	3H707	3H1346

Chart 130

```
***************************************
* AIR COND SWITCH IN ON OR BOOST      *
* POSITION.                           *
* PRIM EXCH WARNING LIGHT ILLUMINATED*
* AIR WARNING LIGHT ILLUMINATED ON    *
* MASTER WARNING PANEL.               *
* ASSOCIATED AURAL WARNING SOUNDS     *
* COND VALVE MAGNETIC INDICATOR       *
* DISPLAYS SHUT.                      *
* RAM AIR MAGNETIC INDICATOR DISPLAYS*
* OPEN.                               *
* TEMPERATURE INDICATED ON CAU IN     *
* INDICATOR IS HIGHER THAN 220°C      *
* HIGH AIRFLOW WHEN GROUP IS          *
* RE-OPENED.                          *
***************************************

*************************************************
* With group operating, check sensing lines     *
* connecting air bottle to mass flow control    *
* valve ; sensing lines are correct :           *
*************************************************
    ||                       |
   YES                       NO    -----------------------------------
    ||                       |----| Repair sensing lines.             |
    ||                             -----------------------------------
    ||
    ||                             -----------------------------------
    ||----------------------------| Replace mass flow control         |
                                  | valve 1H880 [44].                 |
                                   -----------------------------------
```

	MFCV	ZONE
GR 1	1H880	415
GR 2	2H880	426
GR 3	3H880	435
GR 4	4H880	446

Chart 131

```
**************************************-------------------------------
* COND VALVE SWITCH IN ON OR BOOST   *| GROUND EQUIPMENT REQUIRED   |
* POSITION.                          *|-----------------------------|
* PRIM EXCH WARNING LIGHT ILLUMINATED*| DESCRIPTION       PART NO.  |
* AIR WARNING LIGHT ILLUMINATED ON   *|-----------------------------|
* MASTER WARNING PANEL.              *| MULTIMETER                  |
* ASSOCIATED AURAL WARNING SOUNDS    *-------------------------------
* COND VALVE MAGNETIC INDICATOR      *
* DISPLAYS SHUT.                     *
* TEMPERATURE INDICATED ON CAU IN    *
* INDICATOR IS LOWER THAN 220°.      *
**************************************
************************************************
* Remove overheat safety box 1H649 [15].       *
* On connector 1H649A, measure the resistance  *
* between terminals 57 and 47 and between      *
* terminals 57 and 38 (Primary heat exchanger  *
* overheat detector 1H654)                     *
* The resistance value must be equal between   *
* terminals 57 and 47 and terminals 57 and 38 ;*
* it must be approximately 112 ohms at 30°C    *
* or 0 ohms at 0°C.                            *
* Check that insulation is correct between     *
* terminals 38, 47, 57 and the ground.         *
************************************************
    ||   |        ***************************************************
    YES NO        * Disconnect connector 1H654A from primary heat   *
    ||   |        * exchanger overheat detector 1H654 [16]. On      *
    ||   |        * detector side, measure the resistance between   *
    ||   |        * terminals BA and BC. The resistance must be     *
    ||   |--------* approximately equal to 112 ohms at 30°C and     *
    ||            * 100 ohms at 0°C.                                *
    ||            * Check that insulation is correct between        *
    ||            * detector terminals and the ground.              *
    ||            ***************************************************
    ||              YES  NO ----------------------------------------
    ||              ||    |--| Replace overheat detector 1H654 [16] |
    ||              ||       ----------------------------------------
    ||              ||       ----------------------------------------
    ||              ||       | Check and repair wiring between      |
    ||              ||-------| overheat detector 1H654 and overheat |
    ||                       | safety box 1H649. Ref. WDM 21-12-01  |
    ||                       ----------------------------------------
    ||                       ----------------------------------------
    ||                       | Replace overheat safety box          |
    ||-----------------------| 1H649 [15].                          |
                             ----------------------------------------
```

Chart 132

```
**************************************-------------------------------
* COND VALVE SWITCH IN ON OR BOOST    *| GROUND EQUIPMENT REQUIRED    |
* POSITION.                           *|------------------------------|
* SEC EXCH WARNING LIGHT IS           *| DESCRIPTION        PART NO.  |
* ILLUMINATED.                        *|------------------------------|
* AIR WARNING LIGHT ILLUMINATED ON    *| MULTIMETER                   |
* MASTER WARNING PANEL.               *-------------------------------
* ASSOCIATED AURAL WARNING SOUNDS     *
* COND VALVE MAGNETIC INDICATOR       *
* DISPLAYS SHUT.                      *
**************************************
************************************************************
* Check that fire flap and changeover valve operate        *
* correctly. Disconnect connector 1H655A from overheat     *
* detector 1H655 [17]. On detector side, measure the       *
* resistance between terminals BA and BC. The resistance   *
* must be equal between each pair of terminals. It must be *
* approximately equal to 112 ohms at 30°C or 100 ohms at   *
* 0°C.                                                     *
* Check that insulation is correct between terminals B,A,C *
* and the detector body.                                   *
************************************************************
    ||                  |         ------------------------------
    YES                 |--NO-----| Replace overheat detector  |
    ||                            | 1H655 [17].                |
    ||                            ------------------------------
***********************************************************
* Carry out the test procedure described in 21-10-00,     *
* Adjustment/Test paragraph 5.C. The test is correct :    *
***********************************************************
    ||        |
    ||        |    *****************************************************
    YES       NO   * Check continuity of electrical wiring between    *
    ||        |----* overheat detector 1H655 and overheat safety      *
    ||             * box 1H649 [15]. The wiring is correct.           *
    ||             *****************************************************
    ||                 ||      |
    ||                 ||      |         ------------------------------
    ||                 YES     |--NO-----| Repair wiring              |
    ||                 ||                | Ref. WDM 21-12-01          |
    ||                 ||                ------------------------------
    ||                 ||
    ||                 ||
```

Chart 133 (Sheet 1 of 2)

```
 ||                  ||
YES                 YES              --------------------------------
 ||                  ||--------------| Replace overheat safety      |
 ||                                  | box 1H649 [15]               |
 ||                                  --------------------------------
 ||
 ||                                  --------------------------------
 ||                                  | Replace secondary heat       |
 ||----------------------------------| exchanger [50]               |
                                     --------------------------------
```

Chart 133 (Sheet 2 of 2)

```
**************************************-------------------------------
* COND VALVE SWITCH IN ON OR BOOST   *| GROUND EQUIPMENT REQUIRED  |
* POSITION.                          *|----------------------------|
* DUCT WARNING LIGHT ILLUMINATED     *| DESCRIPTION       PART NO. |
* AIR WARNING LIGHT ILLUMINATED ON   *|----------------------------|
* MASTER WARNING PANEL.              *| MULTIMETER                 |
* ASSOCIATED AURAL WARNING SOUNDS    *-----------------------------
* COND VALVE MAGNETIC INDICATOR      *
* DISPLAYS SHUT.                     *
* TEMPERATURE INDICATED ON DUCT      *
* TEMPERATURE INDICATOR IS LOWER THAN*
* 120°.                              *
* BLEED VALVE MAGNETIC INDICATOR     *
* DISPLAYS OPEN.                     *
**************************************
*****************************************************
* Remove overheat safety box 1H649 [15]. On connector*
* 1H649A, measure the resistance between terminals  *
* 51-41 and 51-32.                                  *
* The resistance must be equal between each pair of *
* terminals. The resistance value is 112 ohms at    *
* 30°C and 100 ohms at 0°C approximately.           *
* Check that insulation is correct between terminals *
* 51, 41, 32 and the ground.                        *
*****************************************************
    ||      |    ******************************************
    ||      |    * Disconnect connector 1H657A from overheat   *
    ||      |    * detector 1H657 [19]. On detector side, measure *
    ||      |    * the resistance between terminals A-B and B-C  *
    ||      |-NO-* The resistance value must approximately equal *
    ||           * to 112 ohms at 30°C and 100 ohms at 0°C      *
    ||           * Check that insulation is correct between     *
    ||           * detector pins and the ground.               *
    ||           ******************************************
    ||              ||     |          ------------------------------
    ||              ||     |          | Replace overheat detector  |
    ||              YES    |--NO------| 1H657 [19].                |
    ||              ||                ------------------------------
    ||              ||                ------------------------------
    ||              ||                | Check and repair wiring    |
    ||              ||                | between overheat detector  |
    ||              ||----------------| 1H657 and overheat safety  |
    ||                                | box 1H649                  |
    ||                                | Ref. WDM 21-12-01          |
    ||                                ------------------------------
    ||
    ||
```

Chart 134 (Sheet 1 of 2)

```
      ||
*******************************************************
* On connector 1H649A, measure the resistance         *
* between terminals 39-49 and 30-49. The resistance   *
R * value must be equal to 112 ohms at 30° and 100 ohms *
* at 0°C.                                             *
*******************************************************
      ||       |       *****************************************************
      ||       |       * Disconnect connector 1H658 [20] from overheat     *
      ||       |       * detector 1H658 [20]. On detector side, measure    *
      ||       |       * the resistance between terminals BA and BC        *
     YES       |-NO-*  The resistance values must be equal to 112 ohms*
      ||               * at 30° and 100 ohms at 0°C.                       *
      ||               * Check that insulation is correct between the      *
      ||               * sensor pins and the ground.                       *
      ||               *****************************************************
      ||                     ||        |     ------------------------------
      ||                     ||        |     | Replace overheat detector  |
      ||                    YES        |-NO-| 1H658 [20]                  |
      ||                     ||              ------------------------------
      ||                     ||              ------------------------------
      ||                     ||              | Check and repair the wiring|
      ||                     ||              | between overheat detector  |
      ||                     ||-------------| and overheat safety box     |
      ||                                     | 1H649. Ref. WDM 21-12-04   |
      ||                                     ------------------------------
*******************************************************
R * Carry out test described in 21-12-61, Adjustment/   *
R * Test, paragraph 2C (1). Test is correct             *
*******************************************************
      ||                               |     ------------------------------
R    YES                               |-NO-| Replace relay 1H712 [42]    |
      ||                                     ------------------------------
*******************************************************
R * Carry out test described in 21-12-61, Adjustment/   *
R * paragraph 2C (2). Test is correct                   *
*******************************************************
      ||                               |     ------------------------------
     YES                               |-NO-| Replace pressure switch     |
      ||                                     | 1H659 [21].                |
      ||                                     ------------------------------
      ||                                     ------------------------------
      ||                                     | Replace overheat safety    |
      ||------------------------------------| box 1H649 [15].             |
                                             ------------------------------
```

Chart 134 (Sheet 2 of 2)

```
*************************************-------------------------------
* COND VALVE SWITCH IN ON OR BOOST   *| GROUND EQUIPMENT REQUIRED  |
* POSITION.                          *|----------------------------|
* LEAK WARNING LIGHT ILLUMINATED     *| DESCRIPTION       PART NO. |
* NAC/WING O/HEAT WARNING LIGHT      *|----------------------------|
* EXTINGUISHED.                      *| MULTIMETER                 |
*************************************-------------------------------

*********************************************************
* Carry out the test described in 21-12-37,             *
* Adjustment/Test. Make certain that CAU leak detector  *
* is not triggered for a pressure value lower than 5 psi.*
*********************************************************
        ||                  |
        ||                  |         ------------------------------
        ||                  |         | Replace CAU leak detector  |
       YES                  |---NO----| 1H660 [22].                |
        ||                            ------------------------------
        ||
******************************************************
* Carry out the test described in 21-12-37 on        *
* leak detector 1H662 [23].                          *
******************************************************
        ||                  |
        ||                  |         ------------------------------
        ||                  |---NO----| Replace CAU leak detector  |
        ||                            | 1H662 [23].                |
        ||                            ------------------------------
        ||
        ||                            ------------------------------
        ||                            | Pressurize the generation  |
        ||                            | system.                    |
        ||                            | Determine location of      |
        ||----------------------------| leak (CAU or double wall   |
                                      | pipe)                      |
                                      | Repair faulty system       |
                                      ------------------------------
```

Chart 135

4. Component Identification Table

ITEM No. AND DESCRIPTION		ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
[1] Relay	GR1	123BB	14-123	1H614		21-10-00 R/I	21-12-01
	GR2	123BB	14-123	2H614		21-10-00 R/I	21-12-02
	GR3	123BB	17-123	3H614		21-10-00 R/I	21-12-03
	GR4	123BB	17-123	4H614		21-10-00 R/I	21-12-04
[2] Relay	GR1	123BB	14-123	1H619		21-10-00 R/I	21-12-01
	GR2	123BB	14-123	2H619		21-10-00 R/I	21-12-02
	GR3	123BB	17-123	3H619		21-10-00 R/I	21-12-03
	GR4	123BB	17-123	4H619		21-10-00 R/I	21-12-04
[3] Relay	GR1	123BB	14-123	1H620		21-10-00 R/I	21-12-01
	GR2	123BB	14-123	2H620		21-10-00 R/I	21-12-02
	GR3	123BB	17-123	3H620		21-10-00 R/I	21-12-03
	GR4	123BB	17-123	4H620		21-10-00 R/I	21-12-04
[4] Relay	GR1	123BB	14-123	1H621		21-10-00 R/I	21-12-01
	GR2	123BB	14-123	2H621		21-10-00 R/I	21-12-02
	GR3	123BB	17-123	3H621		21-10-00 R/I	21-12-03
	GR4	123BB	17-123	4H621		21-10-00 R/I	21-12-04

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
[5] Relay GR1	123BB	14-123	1H623		21-10-00 R/I	21-12-01
GR2	123BB	14-123	2H623		21-10-00 R/I	21-12-02
GR3	123BB	17-123	3H623		21-10-00 R/I	21-12-03
GR4	123BB	17-123	4H623		21-10-00 R/I	21-12-04
[6] Warning light DUCT GR1		2-214	1H629		21-10-00 R/I	21-12-05
GR2		2-214	2H629		21-10-00 R/I	21-12-06
GR3		2-214	3H629		21-10-00 R/I	21-12-07
GR4		2-214	4H629		21-10-00 R/I	21-12-08
[7] Diode GR1	123BB	14-123	1H638		21-10-00 R/I	21-12-01
GR2	123BB	14-123	2H638		21-10-00 R/I	21-12-02
GR3	123BB	17-123	3H638		21-10-00 R/I	21-12-03
GR4	123BB	17-123	4H638		21-10-00 R/I	21-12-04
[8] Diode GR1		23-214	1H639		21-10-00 R/I	21-12-01
GR2		23-214	2H639		21-10-00 R/I	21-12-02
GR3		23-214	3H639		21-10-00 R/I	21-12-03
GR4		23-214	4H639		21-10-00 R/I	21-12-04
[9] Diode GR1		23-214	1H640		21-10-00 R/I	21-12-01
GR2		23-214	2H640		21-10-00 R/I	21-12-02
GR3		23-214	3H640		21-10-00 R/I	21-12-03
GR4		23-214	4H640		21-10-00 R/I	21-12-04

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[10] Diode GR1		23-214	1H642		21-10-00 R/I	21-12-01
GR2		23-214	2H642		21-10-00 R/I	21-12-02
GR3		23-214	3H642		21-10-00 R/I	21-12-03
GR4		23-214	4H642		21-10-00 R/I	21-12-04
[11] Diode GR1		23-214	1H643		21-10-00 R/I	21-12-01
GR2		23-214	2H643		21-10-00 R/I	21-12-02
GR3		23-214	3H643		21-10-00 R/I	21-12-03
GR4		23-214	4H643		21-10-00 R/I	21-12-04
[12]Valve-Air conditioning						
GR1	415CL		1H645		21-11-13 R/I	21-11-05
GR2	426CR		2H645		21-11-13 R/I	21-11-06
GR3	435CL		3H645		21-11-13 R/I	21-11-07
GR4	446CR		4H645		21-11-13 R/I	21-11-08
[13]Switch-AIR COND TEST		23-214	H647		21-12-72 R/I	21-12-01
[14]Switch - Rotary test		23-214	H648		21-12-72 R/I	21-12-01
[15]Safety box-Overheat GR1		10-215	1H649		21-12-71 R/I	21-12-01
GR2		10-215	2H649		21-12-71 R/I	21-12-02
GR3		9-216	3H649		21-12-71 R/I	21-12-03
GR4		10-216	4H649		21-12-71 R/I	21-12-04

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
[16]Detector-Overheat, Primary heat exchanger GR1	415AL		1H654		21-12-15 R/I	21-12-01
GR2	426AR		2H654		21-12-15 R/I	21-12-02
GR3	435AL		3H654		21-12-15 R/I	21-12-03
GR4	446AR		4H654		21-12-15 R/I	21-12-04
[17]Detector-Overheat, Secondary Heat Exchanger GR1	534AT		1H655		21-12-32 R/I	21-12-01
GR2	533BT		2H655		21-12-32 R/I	21-12-02
GR3	633BT		3H655		21-12-32 R/I	21-12-03
GR4	634AT		4H655		21-12-32 R/I	21-12-04
[18]Detector-turbine air inlet over-temperature GR1	534AT		1H656		21-13-34 R/I	21-13-01
GR2	533BT		2H656		21-13-34 R/I	21-13-02
GR3	633BT		3H656		21-13-34 R/I	21-13-03
GR4	634AT		4H656		21-13-34 R/I	21-13-04
[19]Detector-Overheat GR1	534AT		1H657		21-12-39 R/I	21-12-01
GR2	533BT		2H657		21-12-39 R/I	21-12-02
GR3	633BT		3H657		21-12-39 R/I	21-12-03

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
GR4	634BT		4H657		21-12-39 R/I	21-12-03
[20]Detector-Overheat GR1	535AT		1H658		21-12-38 R/I	21-12-01
GR2	542AT		2H658		21-12-38 R/I	21-12-02
GR3	642AT		3H658		21-12-38 R/I	21-12-03
GR4	635AT		4H658		21-12-38 R/I	21-12-04
[21]Pressure Switch-CAU Outlet Overtemperature GR1	241BF		1H659		21-12-61 R/I	21-12-01
GR2	241BF		2H659		21-12-61 R/I	21-12-02
GR3	241BF		3H659		21-12-61 R/I	21-12-03
GR4	241BF		4H659		21-12-61 R/I	21-12-02
[22]Detector-leak, CAU GR1	534ET		1H660		21-12-37 R/I	21-12-01
GR2	533FT		2H660		21-12-37 R/I	21-12-02
GR3	633FT		3H660		21-12-37 R/I	21-12-03
GR4	634ET		4H660		21-12-37 R/I	21-12-04
[23]Detector-CAU Double Wall pipe GR1	534ET		1H662		21-12-37 R/I	21-12-01
GR2	533FT		2H662		21-12-37 R/I	21-12-02
GR3	633FT		3H662		21-12-37 R/I	21-12-03

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
GR4	634ET		4H662		21-12-37 R/I	21-12-04
[24]Circuit Breaker AIR COND VALVE EMER CLOSE SUP GR1		1-213	1H667	F 13		21-11-05
GR2		5-213	2H667	A 10		21-11-06
GR3		15-215	3H667	F 02		21-11-07
GR4		13-216	4H667	F 26		21-11-08
[25] Relay GR1	123BB	14-123	1H668		21-10-00 R/I	21-12-01
GR2	123BB	13-123	2H668	123BB	21-10-00 R/I	21-12-02
GR3	123BB	17-123	3H668	123BB	21-10-00 R/I	21-12-03
GR4	123BB	17-123	4H668	123BB	21-10-00 R/I	21-12-04
[26] Diode GR1	123BB	14-123	1H674	123BB	21-10-00 R/I	21-12-01
GR2	123BB	14-123	2H674	123BB	21-10-00 R/I	21-12-02
GR3	123BB	17-123	3H674	123BB	21-10-00 R/I	21-12-03
GR4	123BB	17-123	4H674	123BB	21-10-00 R/I	21-12-04
[27] Diode GR1	123BB	14-123	1H675		21-10-00 R/I	21-12-01
GR2	123BB	14-123	2H675		21-10-00 R/I	21-12-02
GR3	123BB	17-123	3H675		21-10-00 R/I	21-12-03
GR4	123BB	17-123	4H675		21-10-00 R/I	21-12-04

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[28] Relay GR1	123BB	14-123	1H676		21-10-00 R/I	21-12-01
GR2	123BB	14-123	2H676		21-10-00 R/I	21-12-02
GR3	123BB	17-123	3H676		21-10-00 R/I	21-12-03
GR4	123BB	17-123	4H676		21-10-00 R/I	21-12-04
[29] Valve-Cabin Isolation						
GR1	151CB		1H678		21-12-42 R/I	21-12-08
GR2	151CB		2H678		21-12-42 R/I	21-12-06
GR3	151CB		3H678		21-12-42 R/I	21-12-07
GR4	151CB		4H678		21-12-42 R/I	21-12-08
[30]Thermo-switch Overheat						
GR1	541AB		1H679		21-12-41 R/I	21-12-05
GR2	541AB		2H679		21-12-41 R/I	21-12-06
GR3	641AB		3H679		21-12-41 R/I	21-12-07
GR4	641AB		4H679		21-12-41 R/I	21-12-08
[31] Circuit-breaker ENTRY SAFETY VALVE						
SUP GR1		1-213	1H680	E 12	21-10-00 R/I	21-12-05
GR2		5-213	2H680	E 10	21-10-00 R/I	21-13-06
GR3		15-215	3H680	F 3	21-10-00 R/I	21-12-07
GR4		5-216	4H680	F 25	21-10-00 R/I	21-12-08

ITEM No. AND DESCRIPTION		ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
[32] Relay	GR1	123AB	7-123	1H682	123AB	21-10-00 R/I	21-12-05
	GR2	123AB	7-123	2H682		21-10-00 R/I	21-12-06
	GR3	123AB	8-123	3H682		21-10-00 R/I	21-12-07
	GR4	123AB	8-123	4H682		21-10-00 R/I	21-12-08
[33] Relay	GR1	123AB	7-123	1H686		21-10-00 R/I	21-12-05
	GR2	123AB	7-123	2H686	123AB	21-10-00 R/I	21-12-06
	GR3	123AB	8-123	3H686	123AB	21-10-00 R/I	21-12-07
	GR4	123AB	8-123	4H686	123AB	21-10-00 R/I	21-12-08
[34] Relay	GR1	123AB	7-123	1H687		21-10-00 R/I	21-12-05
	GR2	123AB	7-123	2H687		21-10-00 R/I	21-12-06
	GR3	123AB	8-123	3H687		21-10-00 R/I	21-12-07
	GR4	123AB	8-123	4H687		21-10-00 R/I	21-12-08
[35] Diode	GR1	123AB	7-123	1H688		21-10-00 R/I	21-12-05
	GR2	123AB	7-123	2H688		21-10-00 R/I	21-12-06
	GR3	123AB	8-123	3H688		21-10-00 R/I	21-12-07
	GR4	123AB	8-123	4H688		21-10-00 R/I	21-12-08
[36] Diode	GR1	123AB	7-123	1H689		21-10-00 R/I	21-12-05
	GR2	123AB	7-123	2H689	123AB	21-10-00 R/I	21-12-06
	GR3	123AB	8-123	3H689	123AB	21-10-00 R/I	21-12-07
	GR4	123AB	8-123	4H689	123AB	21-10-00 R/I	21-12-08

ITEM No. AND DESCRIPTION		ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
[37] Diode	GR1	123AB	7-123	1H693		21-10-00 R/I	21-12-05
	GR2	123AB	7-123	2H693		21-10-00 R/I	21-12-06
	GR3	123AB	8-123	3H693		21-10-00 R/I	21-12-07
	GR4	123AB	8-123	4H693		21-10-00 R/I	21-12-08
[38] Diode	GR1	123AB	11-123	1H702		21-10-00 R/I	21-12-01
	GR2	123AB	11-123	2H702		21-10-00 R/I	21-12-02
	GR3	123AB	11-123	3H702		21-10-00 R/I	21-12-03
	GR4	123AB	11-123	4H702		21-10-00 R/I	21-12-04
[39] Diode	GR1		2-214	1H706		21-10-00 R/I	21-12-05
	GR2		2-214	2H706		21-10-00 R/I	21-12-06
	GR3		2-214	3H706		21-10-00 R/I	21-12-07
	GR4		2-214	4H706		21-10-00 R/I	21-12-08
[40] Relay	GR1	123AB	7-123	1H707		21-10-00 R/I	21-12-05
	GR2	123AB	7-123	2H707		21-10-00 R/I	21-12-06
	GR3	123AB	8-123	3H707		21-10-00 R/I	21-12-07
	GR4	123AB	8-123	4H707		21-10-00 R/I	21-12-08
[41] Diode	GR1	123AB	7-123	1H710		21-10-00 R/I	21-12-05
	GR2	123AB	7-123	2H710		21-10-00 R/I	21-12-06
	GR3	123AB	8-123	3H710		21-10-00 R/I	21-12-07
	GR4	123AB	8-123	4H710		21-10-00 R/I	21-12-08

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ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[42] Relay GR1	123AB	14-123	1H712		21-10-00 R/I	21-12-05
GR2	123AB	14-123	2H712		21-10-00 R/I	21-12-06
GR3	123AB	17-123	3H712		21-10-00 R/I	21-12-07
GR4	123AB	17-123	4H712		21-10-00 R/I	21-12-08
[43]Circuit breaker FUEL VALVE CONT GR1		2-213	1H863	D 16	24-50-00 R/I	21-13-01
GR2		4-213	2H863	E 12	24-50-00 R/I	21-13-02
GR3		2-213	3H863	F 16	24-50-00 R/I	21-13-03
GR4		4-213	4H863	B 11	24-50-00 R/I	21-13-04
[44]Valve-Mass Flow Control GR1	415CL		1H880		21-11-14 R/I	21-11-05
GR2	426CR		2H880		21-11-14 R/I	21-11-06
GR3	435CL		3H880		21-11-14 R/I	21-11-07
GR4	446CR		4H880		21-11-14 R/I	21-11-08
[45]Valve-Ram Air Control, Primary Heat Exchanger GR1	415AL		1H886		21-12-12 R/I	21-12-51
GR2	426AR		2H886		21-12-12 R/I	21-12-61
GR3	435AL		3H886		21-12-12 R/I	21-12-71
GR4	446AR		4H886		21-12-12 R/I	21-12-81

ITEM No. AND DESCRIPTION		ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[46] Relay	GR1	123BB	14-123	1H901		21-10-00 R/I	
	GR2	123BB	14-123	2H901		21-10-00 R/I	
	GR3	123BB	17-123	3H901		21-10-00 R/I	
	GR4	123BB	17-123	4H901		21-10-00 R/I	
[47] Relay	GR1	123AB	7-123	1H906	123AB	21-10-00 R/I	21-11-61
	GR2	123AB	7-123	2H906		21-10-00 R/I	21-11-61
	GR3	123AB	8-123	3H906	123AB	21-10-00 R/I	21-11-71
	GR4	123AB	8-123	4H906		21-10-00 R/I	21-11-81
[48] Diode	GR1	123AB	7-123	1H3146		21-10-00 R/I	21-12-51
	GR2	123AB	7-123	2H3146		21-10-00 R/I	21-12-61
	GR3	123AB	7-123	3H3146		21-10-00 R/I	21-12-71
	GR4	123AB	7-123	4H3146		21-10-00 R/I	21-12-81
[49]Handle-Engine shut down	GR1		4-211	1W160			21-12-05
	GR2		4-211	2W160			21-12-06
	GR3		4-211	3W160			21-12-07
	GR4		4-211	4W160			21-12-08
[50]Heat Exchanger	GR1					21-12-14 R/I	
Secondary	GR2					21-12-14 R/I	
	GR3					21-12-14 R/I	
	GR4					21-12-14 R/I	

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM

Component Identification
Table 101

END OF THIS SECTION

NEXT

PRIMARY HEAT EXCHANGER - REMOVAL/INSTALLATION

1. General

Removal for replacement
The removal/installation procedure is identical for heat exchangers of each air conditioning group. The heat exchangers are located above each engine.

2. Primary Heat Exchanger (Engine removed)

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 1.80 m (5 ft. 11 in.)	
Special Products (Ref. 20-30-00, No.061)	
Lockwire - Corrosion Resistant Steel : Dia. 0.0275 in. (0.7 mm)	

B. Prepare

(1) Remove the engine (Ref. 71-00-00, Removal/ Installation).

(2) Position access platform.

C. Remove (Ref. Fig. 401)

R (1) Remove clamps (1) (16) (17) (18). Discard seals (20),
R (21) and (22).

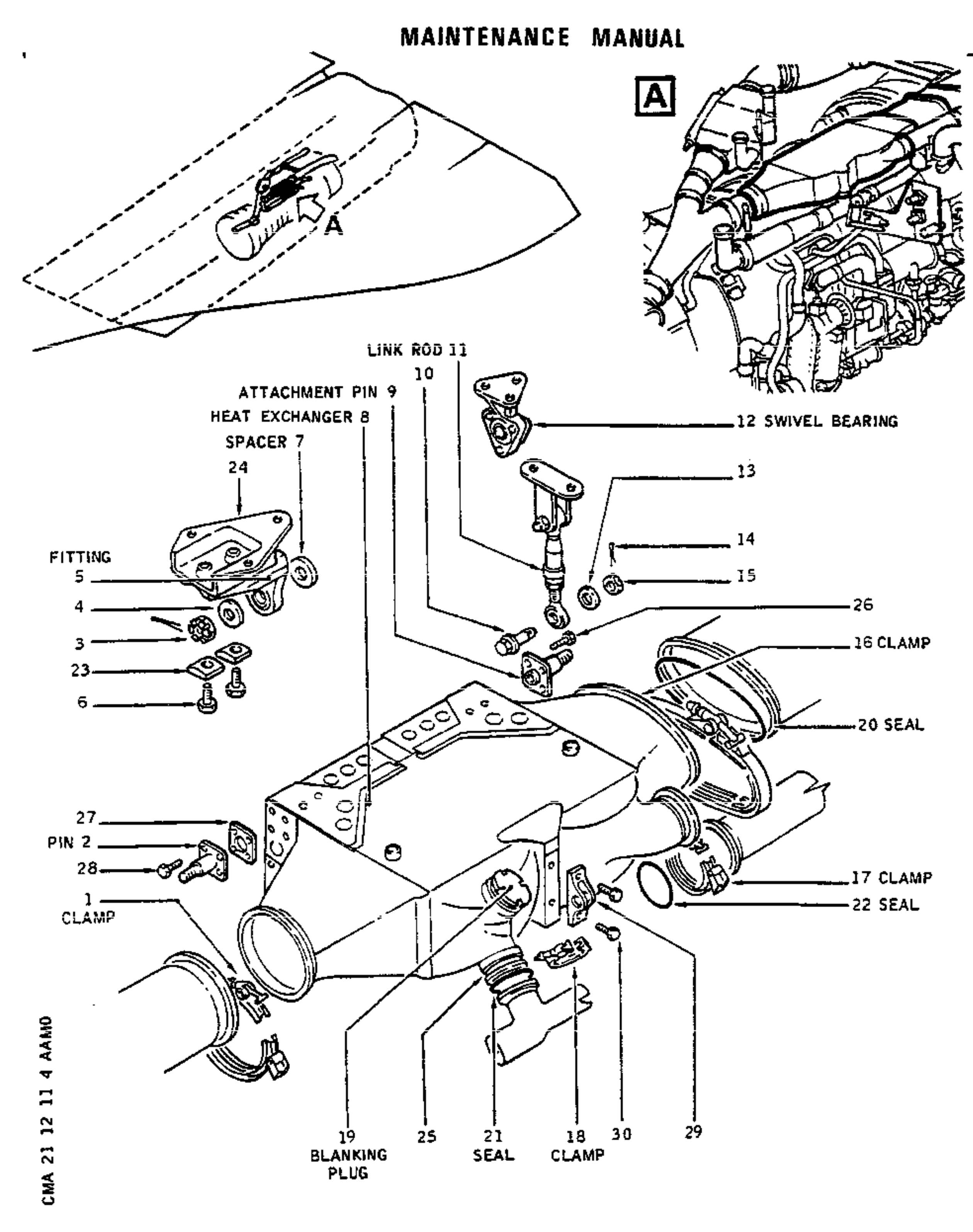
(2) Remove cotter pin (14), nut (15), washer (13) from bolt attaching link rod (11).

(3) Hold heat exchanger (8). Remove nuts (6) and retain spacers (23), remove bolt (10).

CAUTION : THE HEAT EXCHANGER WEIGHT IS 37 KG (81.6 lb).

(4) Remove heat exchanger from swivel bearing (12) and support (24).

(5) Remove cotter pin and castellated nut (3) and retain washer (4) and fitting (5).



Primary Heat Exchanger
Figure 401

R

D. Preparation of Replacement Component

(1) Check that pins (2) and (9) and blanking plug (19) are correctly secured.

(2) On heat exchanger, install spacer (7), fitting (5), washer (4), castellated nut (3). Torque to between 125 and 140 lbf.in. (1.4123 and 1.5818 m.daN).

(3) If necessary drill pin (2) to 3.6 mm (0.141 in.) dia. Safety with cotter pin.

Note : Primary heat exchangers are interchangeable in engine bays 1,3 and 2,4.
It is sometimes necessary to adapt the new heat exchanger to enable correct installation at the required position.
In this cases :

(a) Interchange blanking plug (19) and flange (25) ; check condition of seals ; replace if necessary ; smear bolt thread with product No.061. Torque blanking plug to 1000 lbf.in. (11.288 m.daN) and safety. Torque flange to between 900 and 1000 lbf. in. (10.168 and 11.288 m.daN).

(b) Change location of pin (9).

(b1) Remove lockwire and the four screws (26).

(b2) Install pin (9) at new position, secure with the four screws (26). Torque to between 80 and 85 lbf.in. (0.903 and 0.960 m.daN). Wirelock screws by pairs.

(c) Change location of pin (2).

(c1) Remove lockwire and the four screws (28) ; remove shim plate (27).
Install pin (2) at new location ; install shim plate (27), secure pin (2) with the four screws (28).
Torque to between 160 and 165 lbf.in. (1.807 and 1.864 m.daN). Wirelock screws by pairs.

(d) Remove mid bearing (29) ; cut and remove lockwire and screws (30). Install bearing on new heat exchanger ; install the two screws (30). Torque to between 80 and 85 lbf.in. (0.904 and 0.960 m.daN). Wirelock both screws.

E. Install

(1) Engage heat exchanger in bearing (12) and support (24).

(2) Install fitting (5) and shims (23), secure with screws (6).

(3) Install bolt (10), washer (13), nut (15), cotter pin (14).

R (4) Install new seal (20) and clamps (1) and (16).

R (5) Install new seals (21) and (22) and clamps (17) and
R (18).

CAUTION : GREAT CARE SHALL BE TAKEN WHEN INSTALLING CLAMPS. TORQUE THEM TO 0.6 m.daN
B (53.082 lbf in.). TORQUE LOAD FOR POST
B MOD 21C100 AVICA CLAMPS IS 120 lbf ins.

F. Test

Ref. 21-12-11, Adjustment/Test

G. Close-Up

(1) Remove access platform.

(2) Install engine (Ref. 71-00-00, Removal/Installation).

3. Primary Heat Exchanger (Engine Installed)

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform	
Circuit Breaker Safety Clips	
Protective cover (Teflon, Hard Rubber)	
Wedges	
Warning Notices	

B. Prepare

WARNING : DISPLAY WARNING NOTICES ON THROTTLE CONTROL LEVERS AND ELECTRIC CONTROLS AT FLIGHT ENGINEER'S

STATION.

(1) Position access platform

(2) Open access doors

415AL 415CL for group 1
426AR 426CR for group 2
435AL 435CL for group 3
446AR 446CR for group 4

(3) Trip, safety and tag the following circuit breakers :

Engine 1

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG1 MAIN THROT FAIL IND	1-213	1K 5	A 1
ENG1 N1 GOVERNOR AMP SUP		1K 161	C 1
ENG1 WIND DOWN CONT SUP2		1K1108	C 7
'E' SCHD SUP 1		K 34	E 7
ENG1 SEC AIR DOOR POSN IND		1K 238	F 2
ENG1 START FUEL PUMP SUP		1Q 812	J 6
FQI CONT PNL WARN AND FUEL FLOW TEST SUP		Q1407	J17
LH UC WEIGHT SW "A" SYS SUP		G 292	M17
RH UC WEIGHT SW DOWN LOCK "A" SYS SUP		G 295	M18
AUDIO WARN SYS SUP 1		W 371	M21
ENG1 RH IGNITION SUP		1J 4	N 5
ENG1 RH IGNITION CONT		1J 2	N 6
MWS SUP1		W 252	N21
ADC1 28V SUP		1F 74	P12
ENG4 RH IGNITION CONT		4J 2	R 6
No.1 CSD DISC ON No.2 OIL LP IND		1X 310	R 7
No.2 CSD DISC ON No.1 OIL LP IND		2X 310	R 8
No.2 AND 3 EMER RE'LT BUS SELECT SUP		1X 230	R10
ADC1 26V SUP	2-213	1F 78	A 2
1ST PLT ADC INST SUP		1F 75	B 3
ENG1 SEC AIR DOOR MTR SUP		1K 247	C10
TAR1 SUP		1K2261	E10
ENG1 LH IGNITION SUP		1J 3	E12
ADC1 115V SUP		1F 73	F 3

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG1 MAIN THROT SUP		1K 1	F12
ENG1 N2 RPM INDICATOR		1E 241	G10
ENG1 EXHAUST GAS TEMP IND		1E 301	G12
ENG1 MAIN THROT CONT	3-213	1K 3	A 1
ENG1 ALTN THROT FAIL IND AND AJ MAX SLIP		1K 6	B 1
'E' SCHD SUP2		K 35	B 3
TAR1 CONT AND TAR2 FAIL IND		1K2262	B 4
LH U/C WEIGHT SW AND DOWN LOCK "B" SYS SUP		G 293	B 8
RH U/C WEIGHT SW "B" SYS SUP		G 294	B 9
ENG1 HP VALVE CONT		1K 131	C 1
ENG1 RATING CONT		1K 8	C 3
ENG1 REV THRUST CONT		1K 331	D 1
ENG1 LH IGNITION CONT		1J 1	E 1
ENG1 BAY COOLING FLAP CONT AND IND		1K 231	F 1
ENG1 SHUT DOWN CONT		1K 253	F 3
ENG1 FUEL RECIRC VALVE CONT		1Q 791	G 1
RATING IND SUP		K2300	G 5
EMER GEN AUTO CONT		X 212	G10
ENG VIBRATION IND SUP1	4-213	E 512	C18
ENG1 INT O/HEAT IND		1E 171	D19
ENG1 N1 RPM IND		1E 151	E18
ENG1 TCA AND FUEL TEMP IND		1E 52	E20
ENG1 OIL LOW PRESS IND	5-213	1E 61	A 1
ENG1 REV BUCKET POSN IND		1E 121	A 3
ENG1 TORCHING FLAME DETECT SUP1		1W 412	A17
ENG1 WIND DOWN CONT SUP1		1K1101	B 1
ENG1 WIND DOWN IND		1K1102	B 3
ENG1 AND 4 FUEL HTR IND AND MANL CONT		H1333	B 5
AUDIO WARN SYS SUP2		W 372	C17
ENG1 PP MGT LTS SUP		1E 461	D 1
ENG1 START FUEL PUMP CONT		1Q 811	D 3
MWS SUP2		W 251	D15
ENG1 No.4 BEARING O/HEAT AMP SUP		1E 451	E 1

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
No.1 T1 PROBE HTR SUP	13-213	1H 542	C 9
NASU 2 SUP	13-215	K1137	B13
ENG1 REHEAT IGNITION SUP ØA	14-215	1K1543	B13
ENG1 REHEAT AMP SUP		1K1541	C12
ENG1 % AREA (AJ) IND		1E 81	C13
ENG1 OIL PRESS IND		1E 65	C14
ENG1 FUEL FLOW IND SUP		E 471	C15
ENG1 P7 IND		1E 261	D13
ENG1 OIL CONTENTS AND TEMP IND		1E 232	D14
ENG1 BUCKET CONT UNIT SUP		1K1132	E12
ENG1 REHEAT IGNITION SUP ØC		1K1544	F12
ENG1 ALTN THROT SUP		1K 2	G12
ENG FIRE AND O/HEAT TEST SUP	15-215	W 431	B 1
ENG2 ANTI-ICE CONT		2H1311	B15
ENG1 AND 4 AIR START CONT		K 181	C15
ENG1 LP VALVE POSN IND		1Q 3	C21
ENG1 AND 2 CSD OIL TEMP IND		D 140	D 2
ENG1 AND 4 SEC AIR DOOR CONT		K 236	D17
NASU TEST SUP		K1133	E17
NASU 2 PROG CONT		K1135	F17
ENG1 GRN PUMP CONT AND IND		M 271	D 6
ENG1 AND 4 HP VALVE POSN AMP SUP	13-216	E 211	A 6
2ND PLT ADC INST SUP		2F 75	A14
FUEL CONSUMED TOTAL/WT IND		E 473	D 5
ADC2 26V SUP		2F 78	F14
ADC2 115V SUP		2F 73	F15
NASU 1 SUP	14-216	K1136	A 7
ENG1 AND 4 HP VALVE POSN IND	15-216	E 214	A10
ENG1 ANTI-ICE CONT		1H1311	C10
ENG1 REHEAT CONT		1K1542	E 9

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG1 AIR START VALVE POSN IND		1K 183	D 9
ENG1 AND 4 FUEL HTR AUTO CONT		H1331	A11
ENG1 LP VALVE SUP1		1Q 1	C 1

Engine 2

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG2 MAIN THROT CONT	1-213	2K 3	A 3
ENG2 ALTN THROT FAIL IND AND Aj MAX SLIP		2K 6	B 3
ENG2 REV THRUST CONT		2K 331	B 5
ENG2 REV BUCKET POSN IND		2E 121	B 7
ENG2 HP VALVE CONT		2K 131	C 3
ENG2 OIL LOW PRESS IND		2E 61	C 5
ENG2 SHUT DOWN CONT		2K 253	D 1
ENG2 BAY COOLING FLAP CONT AND IND		2K 231	D 3
ENG2 No.4 BEARING O/HEAT AMP SUP		2E 451	D 5
ENG2 PP MGT LTS SUP		2E 461	E 3
ENG2 FUEL RECIRC VALVE CONT		2Q 791	E 5
'E' SCHD SUP1		K 34	E 7
ENG2 RATING CONT		2K 8	E 8
INT2 STBY HYD SUP		2K1960	E 9
ENG2 WIND DOWN CONT SUP1		2K1101	F 4
ENG2 WIND DOWN IND		2K1102	F 6
ENG2 AND 3 FUEL HTR IND AND MANL CONT		H1334	F 8
ENG2 START FUEL PUMP CONT		2Q 811	G 5
FQI CONT PNL WARN AND FUEL FLOW TEST SUP		Q1407	J17
ENG2 START FUEL PUMP SUP		2Q 812	K 6
LH UC WEIGHT SW "A" SYS SUP		G 292	M17
RH UC WEIGHT SW AND DOWN LOCK "A" SYS SUP		G 295	M18
ENG2 TORCHING FLAME DETECT SUP 1		2W 412	M19
AUDIO WARN SYS SUP1		W 371	M21

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
MWS SUP1		W 252	N21
ENG2 RH IGNITION SUP		2J 4	P 5
ENG2 RH IGNITION CONT		2J 2	P 6
ADC1 28V SUP		1F 74	P12
ENG4 RH IGNITION CONT		4J 2	R 6
No.1 CSD DISC ON No.2 OIL LP IND		1X 310	R 7
No.2 CSD DISC ON No.1 OIL LP IND		2X 310	R 8
2 AND 3 EMER RE'LT BUS SELECT SUP		1X 230	R10
ENG2 LH IGNITION SUP	2-213	2J 3	B10
ENG2 MAIN THROT SUP		2K 1	C12
ENG2 EXHAUST GAS TEMP IND		2E 301	D10
ENG2 N2 RPM IND		2E 241	D12
ENG2 SEC AIR DOOR MTR SUP		2K 247	F10
ENG2 MAIN THROT FAIL IND	3-213	2K 5	A 3
'E' SCHD SUP2		K 35	B 3
LH U/C WEIGHT SW AND DOWN LOCK "B" SYS SUP		G 293	B 8
RH U/C WEIGHT SW "B" SYS SUP		G 294	B 9
ENG2 N1 GOVERNOR AMP SUP		2K 161	D 3
ENG1 LH IGNITION CONT		1J 1	E 1
ENG2 LH IGNITION CONT		2J 1	E 2
RATING IND SUP		K2300	G 5
EMER GEN AUTO CONT		X 212	G10
ENG2 INT O/HEAT IND	4-213	2E 171	B18
ENG2 TCA AND FUEL TEMP IND		2E 52	B20
ENG2 N1 RPM IND		2E 151	C19
ENG VIBRATION IND SUP2		E 513	D18
ENG2 WIND DOWN CONT SUP2	5-213	2K1108	C 1
ENG2 SEC AIR DOOR POSN IND		2K 238	C 3
ENG3 SEC AIR DOOR POSN IND		3K 238	C 4
AUDIO WARN SYS SUP2		W 372	C17
ENG1 PP MGT LTS SUP		1E 461	D 1
MWS SUP2		W 251	D15
ADC2 28V SUP		2F 74	F12
ENG2 REHEAT IGNITION SUP Dia A	13-215	2K1543	A14
ENG2 REHEAT AMP SUP		2K1541	B14

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG2 OIL PRESS IND		2E 65	C13
ENG2 P7 IND		2E 261	C14
ENG2 % AREA (Aj) IND		2E 81	D13
ENG2 OIL CONTENTS AND TEMP IND		2E 232	D14
ENG2 FUEL FLOW IND SUP		E 472	D16
ENG2 REHEAT IGNITION SUP		2K1544	E14
ENG2 ALTN THROT SUP		2K 2	F14
ENG2 AND 3 HP VALVE POSN AMP SUP		E 212	G13
ENG2 BUCKET CONT UNIT SUP		2K1132	G14
No.2 TI PROBE HTR SUP	14-215	2H 549	E 8
ENG2 LP VALVE SUP2	15-215	2Q 2	C19
ENG2 P7 TX SUP		2E 262	A15
ENG FIRE AND O/HEAT TEST SUP		W 431	B 1
ENG2 ANTI-ICE CONT		2H1311	B15
ENG2 AND 3 HP VALVE POSN IND		E 213	B17
ENG2 AIR START VALVE POSN IND		2K 183	C16
INT 3 STBY HYD SUP		3K1960	C18
ENG1 AND 2 CSD OIL TEMP IND		D 140	D 2
ENG2 REHEAT CONT		2K1542	D15
ENG2 AND 3 FUEL HTR AUTO CONT		H1332	E16
NASU TEST SUP		K1133	E17
ENG2 ALTN THROT CONT		2K 4	F15
NASU 2 PROG CONT		K1135	F17
ENG2 YELL PUMP CONT AND IND		M 311	B 8
ENG2 GRN PUMP CONT AND IND		M 272	D 7
2ND PLT ADC INST SUP	13-216	2F 75	A14
FUEL CONSUMED TOTAL/WT IND		E 473	D 5
TAR 2 SUP		2K2261	D 7
ADC2 26V SUP		2F 78	F14
ADC2 115V SUP		2F 73	F15
NASU 1 SUP	14-216	K1136	A 7
TAR 2 CONT AND TAR 1 FAIL IND	15-216	2K2262	A 9

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG2 AND 3 SEC AIR DOOR CONT		K 252	B11
ENG2 LP VALVE POSN IND		2Q 3	C 3
NASU 1 PROG CONT		K1134	C 9
ENG 1 ANTI-ICE CONT		1H1311	C10
ENG 2 AND 3 AIR START CONT		K 182	D11
ENG2 LP VALVE SUP1		2Q 1	F 2

Engine 3

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG3 MAIN THROT CONT	1-213	3K 3	A 4
ENG3 ALTN THROT FAIL IND AND Aj MAX SLIP		3K 6	B 4
ENG3 REV THRUST CONT		3K 331	B 6
ENG3 REV BUCKET POSN IND		3E 121	B 8
ENG3 HP VALVE CONT		3K 131	C 4
ENG3 OIL LOW PRESS IND		3E 61	C 6
ENG3 SHUT DOWN CONT		3K 253	D 2
ENG3 BAY COOLING FLAP CONT AND IND		3K 231	D 4
ENG3 No.4 BEARING O/HEAT AMP SUP		3E 451	D 6
ENG3 RATING CONT		3K 8	E 2
ENG3 PP MGT LTS SUP		3E 461	E 4
ENG3 FUEL RECIRC VALVE CONT		3Q 791	E 6
'E' SCHD SUP1		K 34	E 7
ENG3 WIND DOWN CONT SUP1		3K1101	F 5
ENG3 WIND DOWN IND		3K1102	F 7
ENG2 AND 3 FUEL HTR IND AND MANL CONT		H1334	F 8
ENG3 START FUEL PUMP CONT		3Q 811	G 6
FQI CONT PNL WARN AND FUEL FLOW TEST SUP		Q1407	J17
ENG3 START FUEL PUMP SUP		3Q 812	L 5
LH UC WEIGHT SW "A" SYS SUP		G 292	M17
RH UC WEIGHT SW AND DOWN LOCK "A" SYS SUP		G 295	M18
ENG3 TORCHING FLAME DETECT		3W 412	M20

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SUP1			
AUDIO WARN SYS SUP1		W 371	M21
MWS SUP1		W 252	N21
ADC1 28V SUP		1F 74	P12
ENG3 RH IGNITION SUP		2J 4	Q 5
ENG3 RH IGNITION CONT		3J 2	Q 6
ENG4 RH IGNITION CONT		4J 2	R 6
2 AND 3 EMER RE'LT BUS SELECT SUP		1X 230	R10
ENG3 LH IGNITION SUP	2-213	3J 3	B11
ENG3 MAIN THROT SUP		3K 1	C13
ENG3 EXHAUST GAS TEMP IND		3E 301	D11
ENG3 N2 RPM IND		3E 241	D13
ENG3 MAIN THROT FAIL IND	3-213	3K 5	A 4
'E' SCHD SUP2		K 35	B 3
LH U/C WEIGHT SW AND DOWN LOCK "B" SYS SUP		G 293	B 8
RH U/C WEIGHT SW "B" SYS SUP		G 294	B 9
ENG3 N1 GOVERNOR AMP SUP		3K 161	D 4
ENG1 LH IGNITION CONT		1J 1	E 1
ENG3 LH IGNITION CONT		3J 1	E 3
RATING IND SUP		J2300	G 5
No.3 CSD DISC ON No.4 OIL LP IND		3X 310	G 8
No.4 CSD DISC ON No.3 OIL LP IND		4X 310	G 9
EMER GEN AUTO CONT		X 212	G10
ENG3 SEC AIR MTR DOOR	4-213	3K 247	A19
ENG3 INT O/HEAT IND		3E 171	B19
ENG3 TCA AND FUEL TEMP IND		3E 52	B21
ENG3 N1 RPM IND		3E 151	C20
INT3 RAMP AND SPILL POSN IND		3E 541	F17
ENG3 WIND DOWN CONT SUP2	5-213	3K1108	C 2
ENG3 SEC AIR DOOR POSN IND		3K 238	C 4
AUDIO WARN SYS SUP2		W 372	C17
ENG1 PP MGT LTS SUP		1E 461	D 1
MWS SUP2		W 251	D15
ADC2 28V SUP		2F 74	F12
NASU 2 SUP	13-215	K1137	B13

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG2 AND 3 HP VALVE POSN AMP SUP		E 212	G13
	14-215		
ENG3 P7 TX SUP	15-215	3E 262	A16
ENG FIRE AND O/HEAT TEST SUP		W 431	B 1
ENG3 ANTI-ICE CONT		3H1311	B16
ENG2 AND 3 HP VALVE POSN IND		E 213	B17
ENG3 AIR START VALVE POSN IND		3K 183	C17
ENG3 REHEAT CONT		3K1542	D16
ENG2 AND 3 FUEL HTR AUTO CONT		H1332	E16
NASU TEST SUP		K1133	E17
ENG3 ALTN THROT CONT		3K 4	F16
NASU 2 PROG CONT		K1135	F17
ENG3 BLUE PUMP CONT AND IND		M 342	E 7
ENG3 LP VALVE SUP2		3Q 2	C20
ENG3 REHEAT IGNITION SUP ØA	13-216	3K1543	A 5
ENG3 ALTN THROT SUP		3K 2	A 7
2ND PLT ADC INST SUP		2F 75	A14
ENG3 OIL PRESS IND		3E 65	B 5
ENG3 % AREA (AJ) IND		3E 81	B 6
ENG3 REHEAT AMP SUP		3K1541	B 7
ENG3 BUCKET CONT UNIT SUP		3K1132	C 6
ENG3 P7 IND		3E 261	C 7
ENG3 FUEL FLOW IND SUP		E 564	D 4
FUEL CONSUMED TOTAL/WT IND		E 473	D 5
ENG3 OIL CONTENTS AND TEMP IND		3E 232	D 6
ENG3 REHEAT IGNITION SUP ØC		3K1544	F 6
ADC2 26V SUP		2F 78	F14
ADC2 115V SUP		2F 73	F15
NASU 1 SUP	14-216	K1136	A 7
ENG2 AND 3 SEC AIR DOOR CONT	15-216	K 252	B11
ENG3 LP VALVE POSN IND		3Q 3	C 4

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NASU 1 PROG CONT		K1134	C 9
ENG4 ANTI-ICE CONT		4H1311	C11
ENG3 AND 4 CSD OIL TEMP IND		D 141	C25
ENG2 AND 3 AIR START CONT		K 182	D11
ENG3 LP VALVE SUP1		3Q 1	F 1

Engine 4

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG4 MAIN THROT FAIL IND	1-213	4K 5	A 2
ENG4 N1 GOVERNOR AMP SUP		4K 161	C 2
ENG4 WIND DOWN CONT SUP2		4K1108	C 8
'E' SCHD SUP1		K 34	E 7
ENG4 SEC AIR DOOR POSN IND		4K 238	F 3
FQI CONT PNL WARN AND FUEL FLOW TEST SUP		Q1407	J17
ENG4 START FUEL PUMP SUP		4Q 812	M 6
LH UC WEIGHT SW "A" SYS SUP		G 292	M17
RH UC WEIGHT SW AND DOWN LOCK "A" SYS SUP		G 295	M18
AUDIO WARN SYS SUP1		W 371	M21
MWS SUP1		W 252	N21
ADC1 28V SUP		1F 74	P12
ENG4 RH IGNITION SUP		4J 4	R 5
ENG4 RH IGNITION CONT		4J 2	R 6
2 AND 3 EMER RE'LT BUS SELECT SUP		1X 230	R10
ADC1 26V SUP	2-213	1F 78	A 2
1ST PLT ADC INST SUP		1F 75	B 3
ENG4 LH IGNITION SUP		4J 3	E13
ADC1 115V SUP		1F 73	F 3
ENG4 MAIN THROT SUP		4K 1	F13
ENG4 N2 RPM IND		4E 241	G11
ENG4 EXHAUST GAS TEMP IND		4E 301	G13
INT 4 RAMP AND SPILL POSN IND		4E 541	F14
ENG4 MAIN THROT CONT	3-213	4K 3	A 2

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG4 ALT THROT FAIL IND AND Aj MAX SUP		4K 6	B 2
'E' SCHD SUP2		K 35	B 3
LH U/C WEIGHT SW AND DOWN LOCK "B" SYS SUP		G 293	B 8
RH U/C WEIGHT SW "B" SYS SUP		G 294	B 9
ENG4 HP VALVE CONT		4K 131	C 2
ENG4 RATING CONT		4K 8	C 4
ENG4 REV THRUST CONT		4K 331	D 2
ENG1 LH IGNITION CONT		1J 1	E 1
ENG4 LH IGNITION CONT		4J 1	E 4
ENG4 BAY COOLING FLAP CONT AND IND		4K 231	F 2
ENG4 SHUT DOWN CONT		4K 253	F 4
ENG4 FUEL RECIRC VALVE CONT		4Q 791	G 2
RATING IND SUP		K2300	G 5
No.3 CSD DISC ON No.4 OIL LP IND		3X 310	G 8
No.4 CSD DISC ON No.3 OIL LP IND		4X 310	G 9
EMER GEN AUTO CONT		X 212	G10
ENG4 INT O/HEAT IND	4-213	4E 171	D20
ENG4 N1 RPM IND		4E 151	E19
ENG4 TCA AND FUEL TEMP IND		4E 52	E21
ENG4 SEC AIR DOOR MTR SUP		4K 247	F19
ENG4 OIL LOW PRESS IND	5-213	4E 61	A 2
ENG4 REV BUCKET POSN IND		4E 121	A 4
INT 4 STBY HYD SUP		4K1960	A 6
ENG4 TORCHING FLAME DETECT SUP1		4W 412	A18
ENG4 WIND DOWN CONT SUP1		4K1101	B 2
ENG4 WIND DOWN IND		4K1102	B 4
ENG1 AND 4 FUEL HTR IND AND MANL CONT		H1333	B 5
AUDIO WARN SYS SUP2		W 372	C17
ENG1 PP MGT LTS SUP		1E 461	D 1
ENG4 PP MGT LTS SUP		4E 461	D 2
ENG4 START FUEL PUMP CONT		4Q 811	D 4
MWS SUP2		W 251	D15
ENG4 No.4 BEARING O/HEAT AMP SUP		4E 451	E 2

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NASU 2 SUP	13-216	K1137	B13
ENG FIRE AND O/HEAT TEST SUP	15-215	W 431	B 1
ENG3 ANTI-ICE CONT		3H1311	B16
ENG1 AND 4 AIR START CONT		K 181	C15
ENG4 LP VALVE POSN IND		4Q 3	C22
ENG1 AND 4 SEC AIR DOOR CONT		K 236	D17
NASU TEST SUP		K1133	E17
NASU 2 PROG CONT		K1135	F17
ENG4 YELL PUMP CONT AND IND		M 312	B 9
ENG4 BLUE PUMP CONT AND IND		M 343	E 8
ENG1 AND 4 HP VALVE POSN AMP SUP	13-216	E 211	A 6
2ND PLT ADC INST SUP		2F 75	A14
FUEL CONSUMED TOTAL/WT IND		E 473	D 5
ADC2 26V SUP		2F 78	F14
ADC2 115V SUP		2F 73	F15
No.4 T1 PROBE HTR SUP		4H 542	C11
ENG4 REHEAT IGNITION SUP Dia A	14-216	4K1543	A 6
NASU 1 SUP		K1136	A 7
ENG4 FUEL FLOW IND SUP		E 565	B 3
ENG 4% AREA (Aj) IND		4E 81	B 6
ENG4 P7 IND		4E 261	B 7
ENG4 BUCKET CONT UNIT SUP		4K1132	C 6
ENG4 ALTN THROT SUP		4K 2	C 7
ENG4 OIL PRESS IND		4E 65	D 6
ENG4 REHEAT AMP SUP		4K1541	D 7
ENG4 OIL CONTENTS AND TEMP IND		4E 232	E 6
ENG4 REHEAT IGNITION SUP Dia C		4K1544	E 7
ENG1 AND 4 HP VALVE POSN IND	15-216	E 214	A10
ENG1 AND 4 FUEL HTR AUTO CONT		H1331	A11
ENG4 P7 TX SUP		4E 262	B10
ENG4 LP VALVE SUP1		4Q 1	C 2
NASU 1 PROG CONT		K1134	C 9

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG4 ANTI-ICE CONT		4H1311	C11
ENG3 AND 4 CSD OIL TEMP IND		D 141	C25
ENG4 AIR START VALVE POSN IND		4K 183	D10
ENG4 REHEAT CONT		4K1542	E10
ENG4 ALTN THROT CONT		4K 4	F11

(4) For engines 2 and 4

WARNING : INSTALL A PROTECTIVE COVER ON AIR STARTER IN ORDER TO PREVENT INGRESS OF FOREIGN OBJECTS OR MISCELLANEOUS ITEMS IN AIR STARTER.

(5) Remove dust centrifuger and elbow connecting dust centrifuger to heat exchanger (Ref. Fig. 402)

(a) Unlock and remove union (8).

(b) Remove clamps (1) and (3).

(c) On dust centrifuger side, disconnect linkrod securing dust centrifuger.

(6) Remove sense lines (Ref. Fig. 402)

(a) Unlock and remove unions (4) and (5) ; remove sense line (6).

(b) Unlock and remove unions (11) and (13) ; remove sense line (26).

(c) Unlock and remove unions (12) (14) and (15) ; simultaneously remove sense lines (19) and (20).

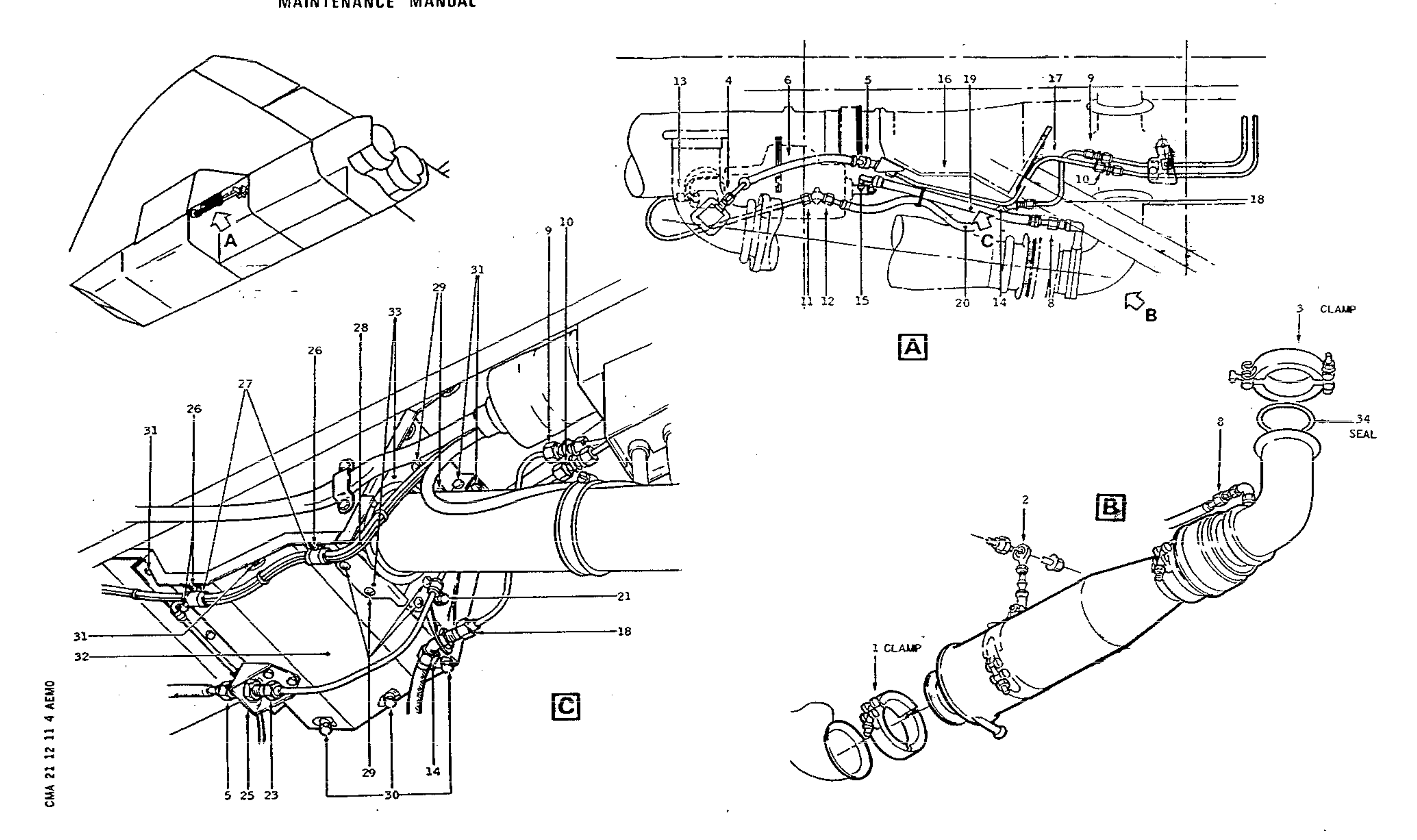
(d) Unlock and remove unions (9) and (24) ; remove sense line (18).

(e) Unlock and remove unions (10) and (23) ; remove clamp (21) and sense line (17).

(f) Remove support (25).

(7) Remove primary heat exchanger ram air control valve (Ref. Fig. 403)

INTENTIONALLY BLANK



Dust Centrifuger and Sense Lines
Figure 402

(a) Remove electrical connector (1)

(b) Remove clamps (2) and (3).

(c) Remove the valve.

(8) Remove heat shield (Ref. Fig. 402)

(a) Remove screws (26) securing electrical bundle (28) clamps (27) and remove bundles from heat shield.

(b) Remove screws (29) and both half heat shields (33).

(c) Remove screws (31), unlock and remove the three screws (30), remove the heat shield (32). The three screws are of different lengths, note their location for re-installation.

(9) For engines 1 and 3 (Ref. Fig. 404). Removal of fuel heating line.

(a) Remove the screws securing half-clamps (1), (4) and (16).

(b) Remove securing clamps (2) and (5).

(c) Remove duct.

(d) Remove handling fitting (3).

C. Remove (Ref. Fig. 405)

(1) Remove clamps (14) and (13). Discard seals (15) and (16).

(2) Install a protective cover (Teflon plate or rubber mat) above heat exchanger so as to protect heat shield.

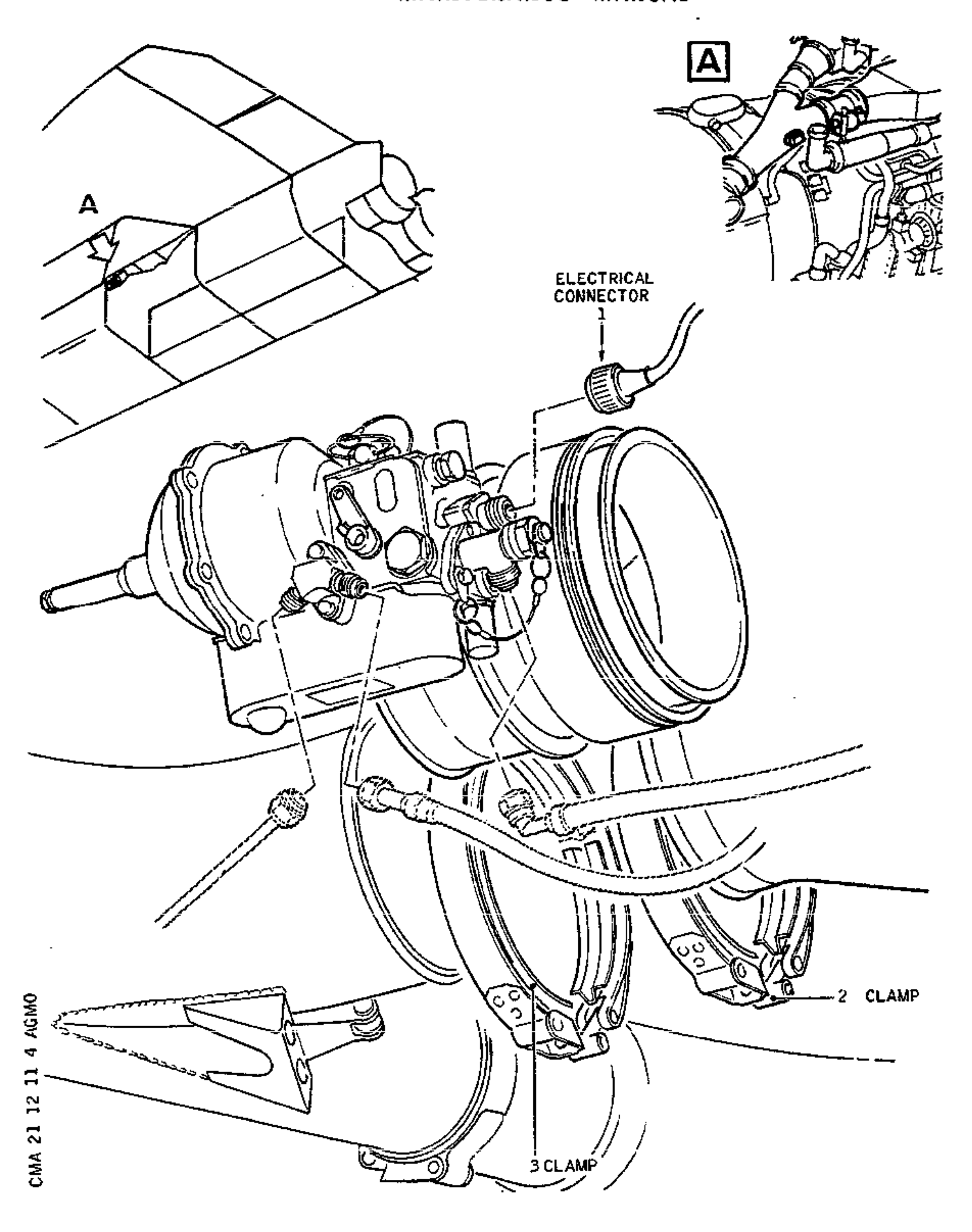
(3) Hold heat exchanger in position by means of wedges.

(4) Remove screws (5).

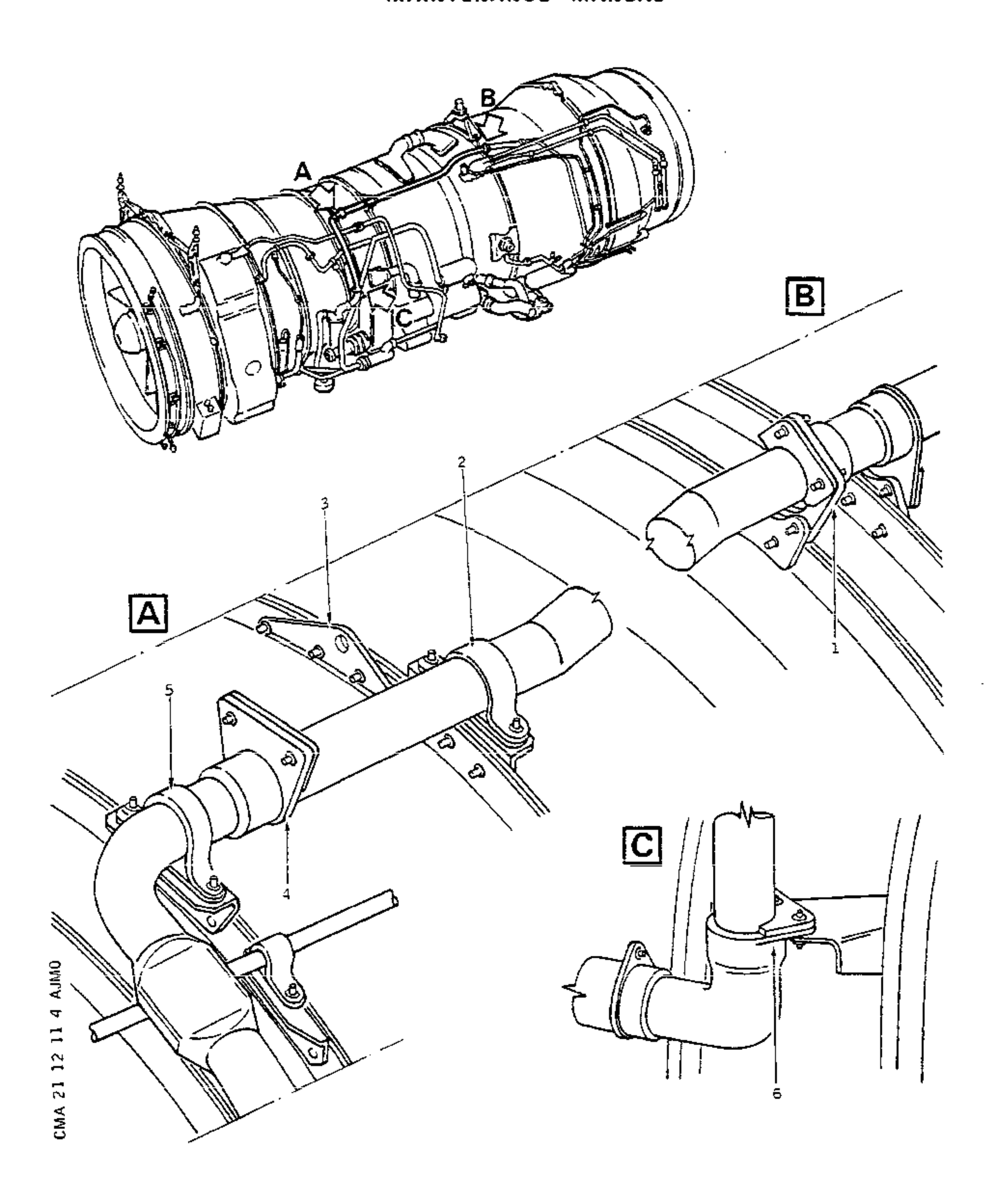
(5) Remove cotter pin from nut (12), retain washer (11) and bolt (9) securing link rod (10).

WARNING: THE HEAT EXCHANGER WEIGHS 37 KG (81.57 lb).

(6) Ease heat exchanger (7) forward in order to disengage aft pin (8) and fitting (4) from their support.



Primary Heat Exchanger Ram Air Control Valve
Figure 403



Fuel Heating Line
Figure 404

(7) Continue to manoeuvre heat exchanger forward and downward in order to clear nacelle, progressively removing wedges.

NOTE : During removal, handle heat exchanger with care to avoid damage to ducts located under primary heat exchanger.

(8) With heat exchanger removed, affix seal (15) on cooling air duct with product No.313 (CAF4).

(9) On removed heat exchanger, on forward pin (1), remove cotter pin, nut (3), washer (2) and retain fitting (4) and spacer (6).

(10) Remove protective mat or teflon plate.

D. Preparation of Replacement Component (Ref. Fig. 405)

(1) On heat exchanger pin (1), install:
- spacer (6)
- fitting (4)
- washer (2)
Screw nut (3)
Install cotter pin.

E. Install (Ref. Fig. 405)

(1) Install heat exchanger (7) above the engine by means of wedges.
Install pin (8) in front of aft bearing and fitting (4) in front of its support.

(2) Push heat exchanger rearward in order to engage pin and fitting in their support. Install both screws (5).

(3) Install clamp (13).

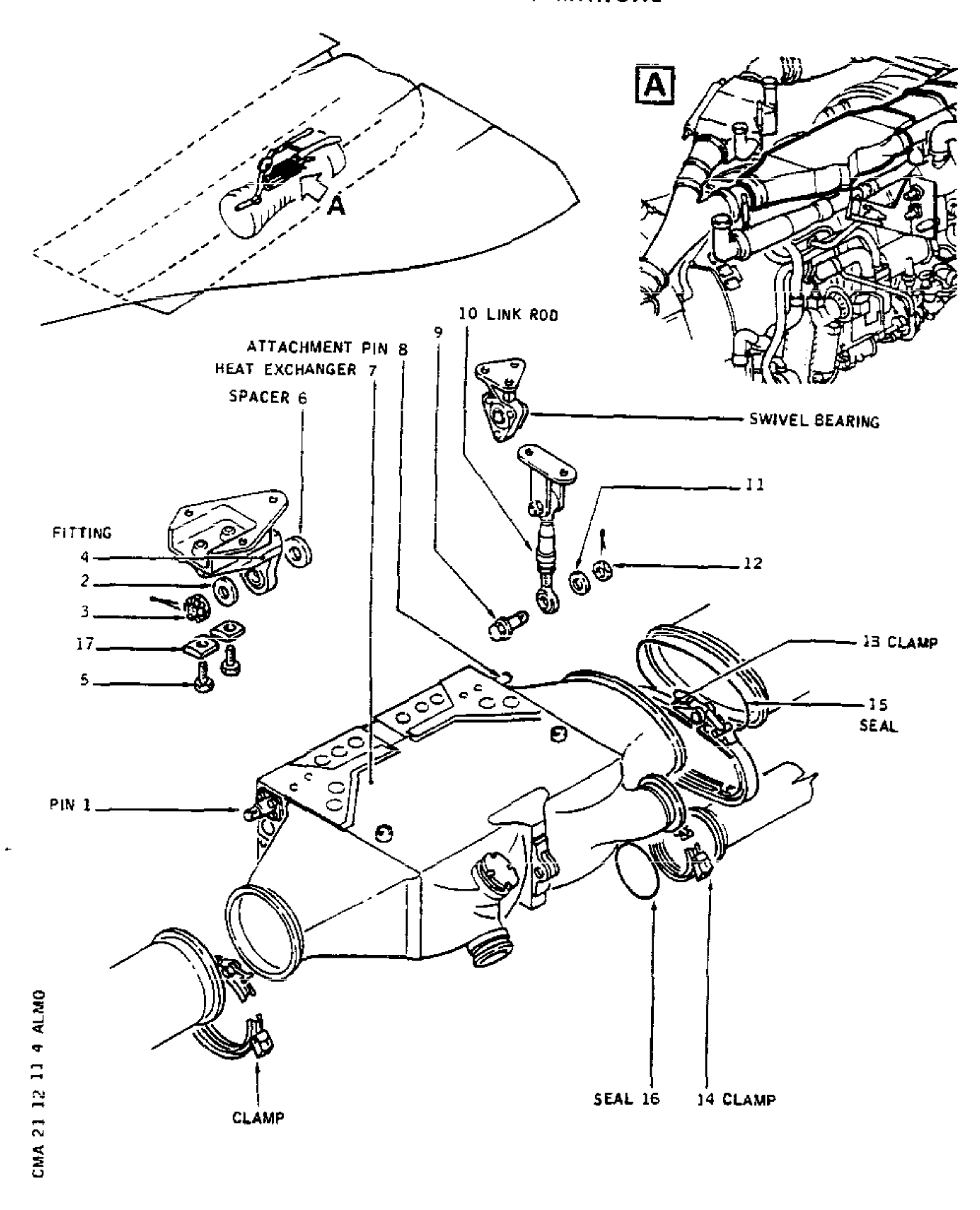
(4) Tighten screws (5).

(5) Install link rod (10), with bolt (9), washer (11) and nut (12). Install cotter pin.

(6) Install a new seal (16) and clamp (14).

CAUTION : INSTALL CLAMPS WITH GREAT CARE AND TIGHTEN.
RB TORQUE TO 0.6 m.daN (53.082 lbf in.) TORQUE
RB LOAD FOR POST MOD 21C100 AVICA CLAMPS IS 120
RB lbs/ins.

F. Test



Primary Heat Exchanger
Figure 405

R Ref. 21-12-11, Adjustment/Test

R G. Close-Up

(1) Install handling fitting

(2) Install fuel heating line, engines 1 and 3 only (Ref. Fig. 404)

(a) Install fuel line (Ref. 75-03-01, Removal/Installation).

(b) Secure attach fittings (1), (4) and (6) with screws.

(c) Install half-clamps (2) and (5).

(3) Install heat shield (Ref. Fig. 402)

(a) Install heat shield (32). Secure with 3 screws (30). Install screws at correct location. Wirelock screws (30)

(b) Install screws (31).

(c) Install half heat shields (3) ; secure with screws (29).

(d) Install electrical bundles (28) ; secure clamps (27) by means of screws (26).

(4) Install primary heat exchanger ram air control valve. (Ref. Fig. 403)

(a) Install valve ; secure with clamps (2) and (3). Rotate the valve so as to engage positioning lug in its housing.

(b) Tighten clamps (2) and (3).

(c) Connect electrical connector (1).

(5) Install sense lines (Ref. Fig. 402)

(a) Install support (25).

(b) Install sense line (17) using unions (10) and (23), install clamp (21). Wirelock unions.

(c) Install sense line (18) by means of unions (9) and (24). Wirelock unions.

(d) Install sense lines (19) and (20) using unions (12) (14) and (15).
Tighten unions (12) and (14). Torque to between 70 and 120 lbf. in. (0.79 and 1.35 m.daN.)
Tighten sense line (19) union (15). Torque to between 85 and 150 lbf. in. (0.96 and 1.69 m.daN).
Wirelock unions.

(e) Install sense line (26) using unions (11) and (13).
Tighten unions (11) and (13). Torque to between 70 and 120 lbf. in. (0.79 and 1.35 m.daN).
Wirelock unions.

(f) Install sense line (6) using unions (4) and (5) - Tighten unions (4) and (5) - Torque to between 70 and 120 lbf. in. (0.79 and 1.35 m.daN).
Wirelock unions.

(6) Install the dust centrifuger/elbow assembly (Ref. Fig. 402)

(a) Install the dust centrifuger/elbow assembly.

(b) Install new seal (34); install clamps (1) and (3).

(c) Install link rod (2).

(d) Install union (8) ; tightem and torque to between 85 and 150 lbf. in. (0.96 and 1.69 m.daN).

(7) For engines 2 and 4.

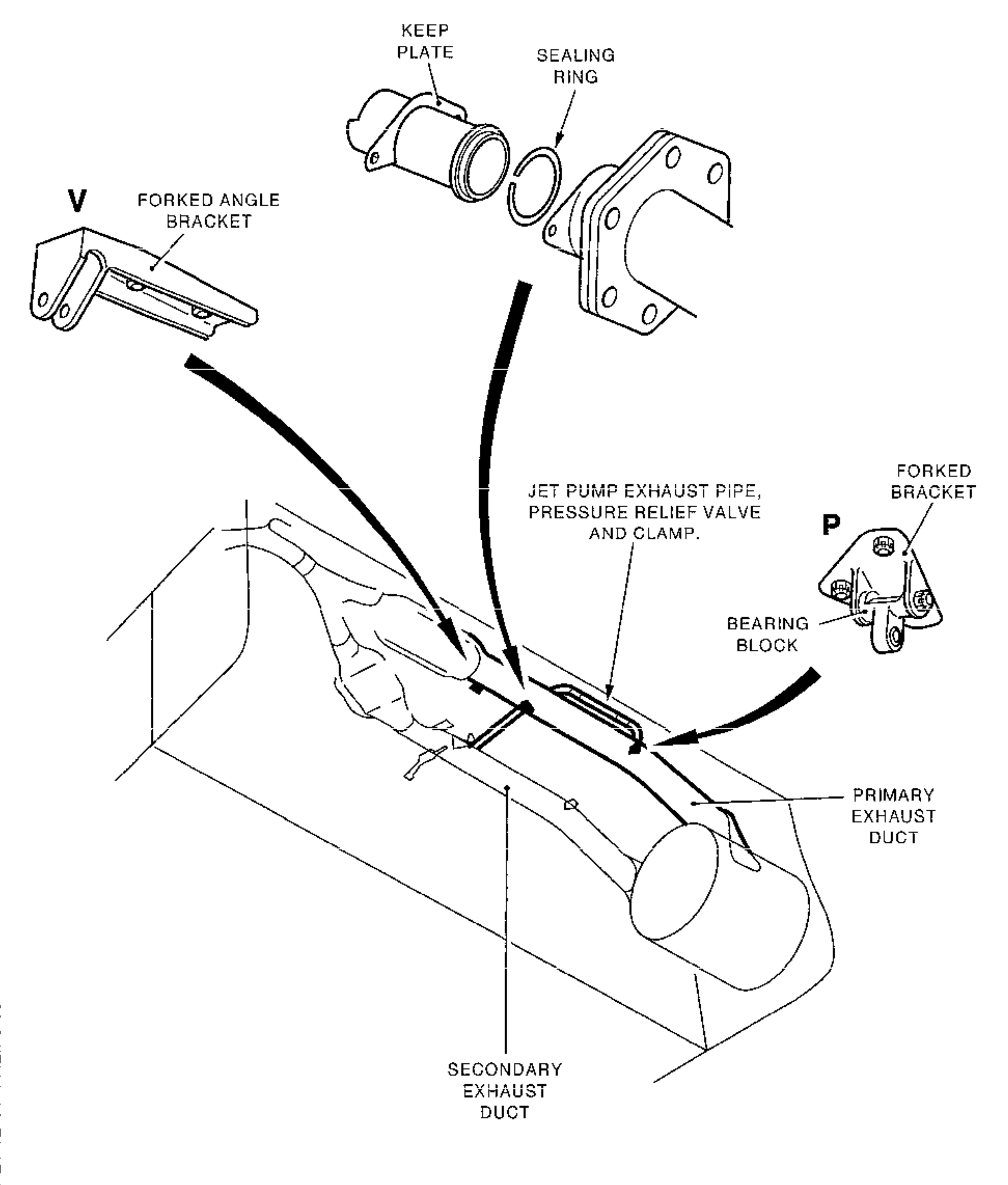
Remove protective screen from air starter.

(8) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 3B (3).

(9) Close access doors.

(10) Remove access platform.

(11) Remove warning notices.



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BAY 1 SHOWN, BAYS 2,3 AND 4 SIMILAR.

Primary Heat Exchanger Exhaust Duct
Mounting Brackets
Figure 406

H. Primary Heat Exchanger Exhaust Duct - Removal/Installation

(1) Removal. (Ref. Fig. 406)

(a) On primary heat exchanger exhaust duct remove and retain nuts, bolts and washers from crossfeed pipe keep-plates.

(b) Remove and retain crossfeed pipe, sealing rings and keep-plates.

(c) Disconnect, remove and retain the clamp from the jet pump exhaust pipe pressure relief valve. Remove the locking wire, bolts and washers from the exhaust pipe to exhaust duct connection.

(d) Remove jet pump exhaust pipe.

(e) Blank off all apertures.

(f) Support exhaust ducts.

(g) Remove the wirelocking, bolts and washers securing bearing block (Detail P) to the exhaust duct.

(h) Remove the nut and bolt securing the bearing block to the forked angle bracket (Detail V) at front of exhaust duct.

(j) Lower and remove primary exhaust duct.

(2) Installation of Primary Exhaust Duct (Ref. Fig.406)

(a) Connect bearing block (Detail P) to exhaust duct using bolt and washer. Torque tighten the bolt to between 10 and 15 lbf in (0.113 and 0.339 mdaN). Wirelock to MP13.

(b) Connect the bearing block to the forked angle bracket (Detail V), secure with nut, washer and bolt. Torque tighten bolt to MP3.

(c) Refit jet pump exhaust pipe to the pressure relief valve and the exhaust duct. Secure in position with clamp, nuts, bolts and washers. Torque tighten bolts to between 25 and 30 lbf in (0.113 and 0.339 mdaN). Wirelock to MP13.

(d) Refit crossfeed pipe using sealing rings and keep plates. Secure using nuts, bolts and washers. Torque tighten bolts to MP3.

PRIMARY HEAT EXCHANGER - ADJUSTMENT/TEST

1. General

The purpose of this test is to check the primary heat exchanger for evidence of leakage after a removal/installation operation, It must be carried out before engine installation.

2. Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Ground air supply Unit - Relative Minimum Pressure 2 bars Airflow 0.4 kg/sec. - Relative Maximum Pressure 4.5 bars Airflow 0.6 kg/sec. - Temperature must not exceed 300°C	
Blanking Plug - Engine HP Elbow Duct	D921624000
RB Coupling Equipment - Ground Air B Supply Unit	D921603000
Circuit Breaker Safety Clip	

B. Prepare

B (1) Install air bleed duct blanking plug.

(2) Remove blanking plate upstream of pressure reducing and shut off valve and install coupling equipment.

B

(3) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing)

(4) Connect ground air supply unit to coupling equipment.

(5) Trip, safety and tag one of the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1 GR1 LH UC WEIGHT SW	1-213	G 292	M17
Group 2 GR2 LH UC WEIGHT SW	3-213	G 293	B 8
Group 3 GR3 RH UC WEIGHT SW	3-213	G 294	B 9
Group 4 GR4 RH UC WEIGHT SW	1-2-13	G 295	M18

C. Test

(1) On AIR BLEED control panel 2-214 check that CROSS BLEED switch is in SHUT position.

(2) Start up ground air supply unit.

(3) On AIR BLEED CONTROL panel, place :

- BLEED VALVE switch in OPEN position, BLEED VALVE magnetic indicator displays a vertical stripe. Pressure indicator indicates a pressure value.
- COND VALVE switch in ON position : COND VALVE magnetic indicator displays a vertical stripe. MASS FLOW indicator indicates a certain value.

(4) Check for evidence of leakage at level of primary heat exchanger attachment clamps.

(5) On AIR BLEED CONTROL panel place :

- COND VALVE switch in OFF position : COND VALVE magnetic indicator displays a horizontal stripe.
- BLEED VALVE switch in SHUT position, BLEED VALVE magnetic indicator displays a horizontal stripe.

(6) Shut down ground air supply unit.

D. Close-Up

(1) Remove safety clip and tag and reset the circuit breaker tripped in paragraph 2 B (5).

(2) De-energize the aircraft electrical network and disconnect electrical ground power unit.

(3) Disconnect ground air supply unit.

(4) Disconnect coupling equipment and install blanking plate.

(5) Remove blanking plug.

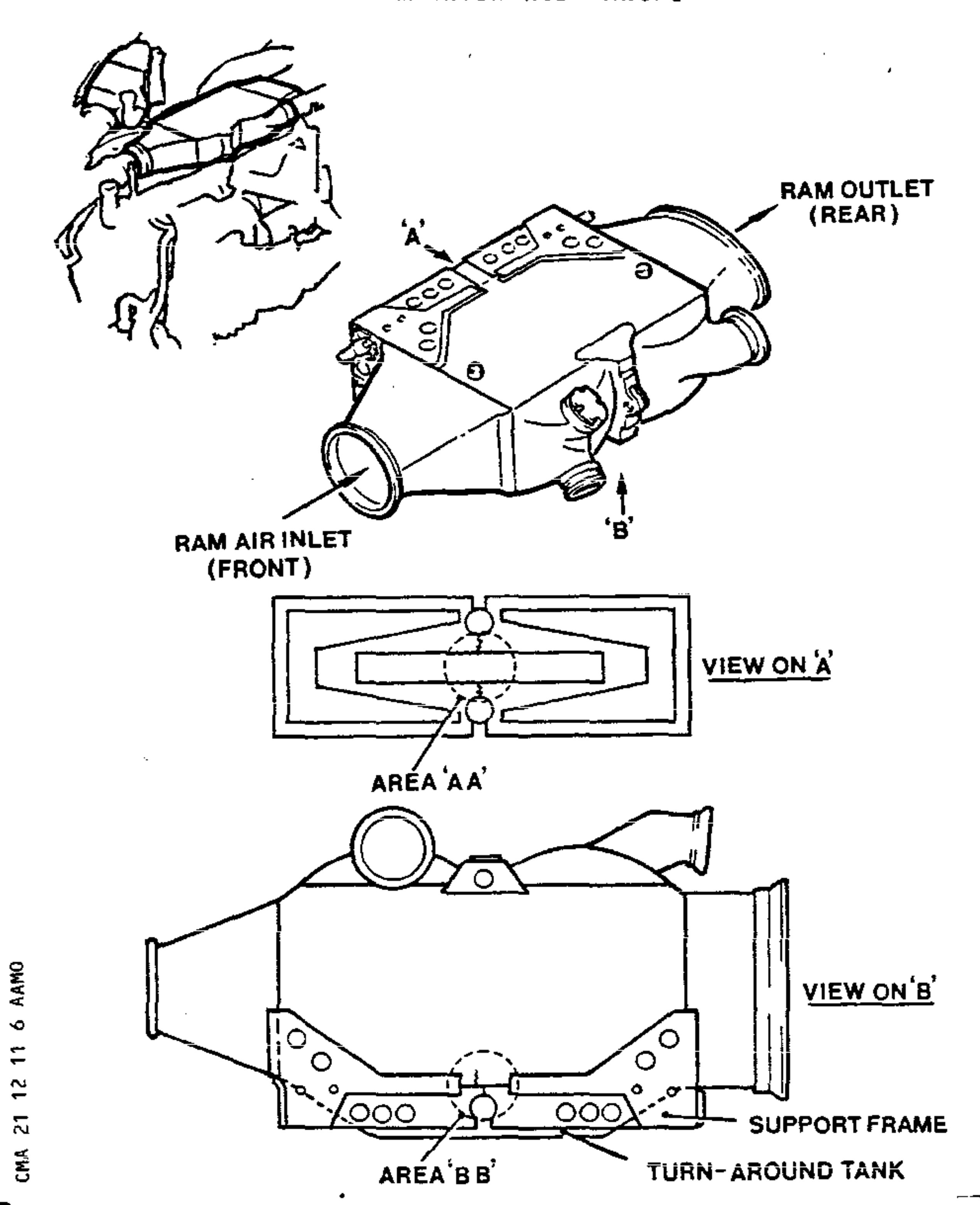
PRIMARY HEAT EXCHANGER - INSPECTION/CHECK

1. Acceptable Cracks (Ref. Fig. 601)

   Cracks in and adjacent to the support frame found at an inspection/check are acceptable as follows:

   A. Area AA. Cracks from the stress relief cut out and terminating at the turn round tank - cracks must not extend into tank. The length of crack along weld between frame and tank must not exceed 2.5 inches (63.5 mm).

   B. Area BB. Cracks from the stress relief cut out across the frame and into the horizontal face must not extend more than 2 inches (50.8 mm) into the horizontal face.



Primary Heat Exchange
Figure 601

PRIMARY HEAT EXCHANGER RAM AIR CONTROL VALVE - REMOVAL/INSTALLATION

1. General

The removal/installation procedure is identical for the ram air control valve of each air conditioning group.

2. Primary Heat Exchanger Ram Air Control Valve

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 1.8 m (5 ft. 11 in.)	
R Circuit Breaker Safety Clip	

B. Prepare

R (1) Trip, safety and tag one of the following circuit
R breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1 GRP1 AIR GEN CONT & IND	1-213	1H 862	D13
Group 2 GRP2 AIR GEN CONT & IND	5-213	2H 862	F 9
Group 3 GRP3 AIR GEN CONT & IND	15-215	3H 862	B 3
Group 4 GRP4 AIR GEN CONT & IND	15-216	4H 862	B23

(2) Position access platform.

(3) Open access door

R 415AL for group 1 ram air control valve
R 426AR for group 2 ram air control valve
R 435AL for group 3 ram air control valve
R 446AR for group 4 ram air control valve

(4) Remove dust centrifuger (Ref. 21-16-12, Removal/ Installation).

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1).

(2) Remove unions (7)(9)(10).

(3) Remove clamps (6) and (8).

(4) Remove valve (11) fitted with union (3) coupling it to the primary heat exchanger.

(5) On removed valve (11).

(a) Remove retaining ring (2).

(b) Remove coupling union (3).

D. Preparation of Replacement Component

(1) Check condition of seal (5) and of back-up ring (4). Replace them if necessary.

(2) Install coupling union (3) on valve (11). Install retaining ring (2).

E. Install

(1) Install equipped valve (11). Install clamps (6) and (8)
R Do not tighten at this stage.

(2) Install unions (7)(9)(10).

(3) Tighten clamps (6) and (8).

(4) Install electrical connector (1).

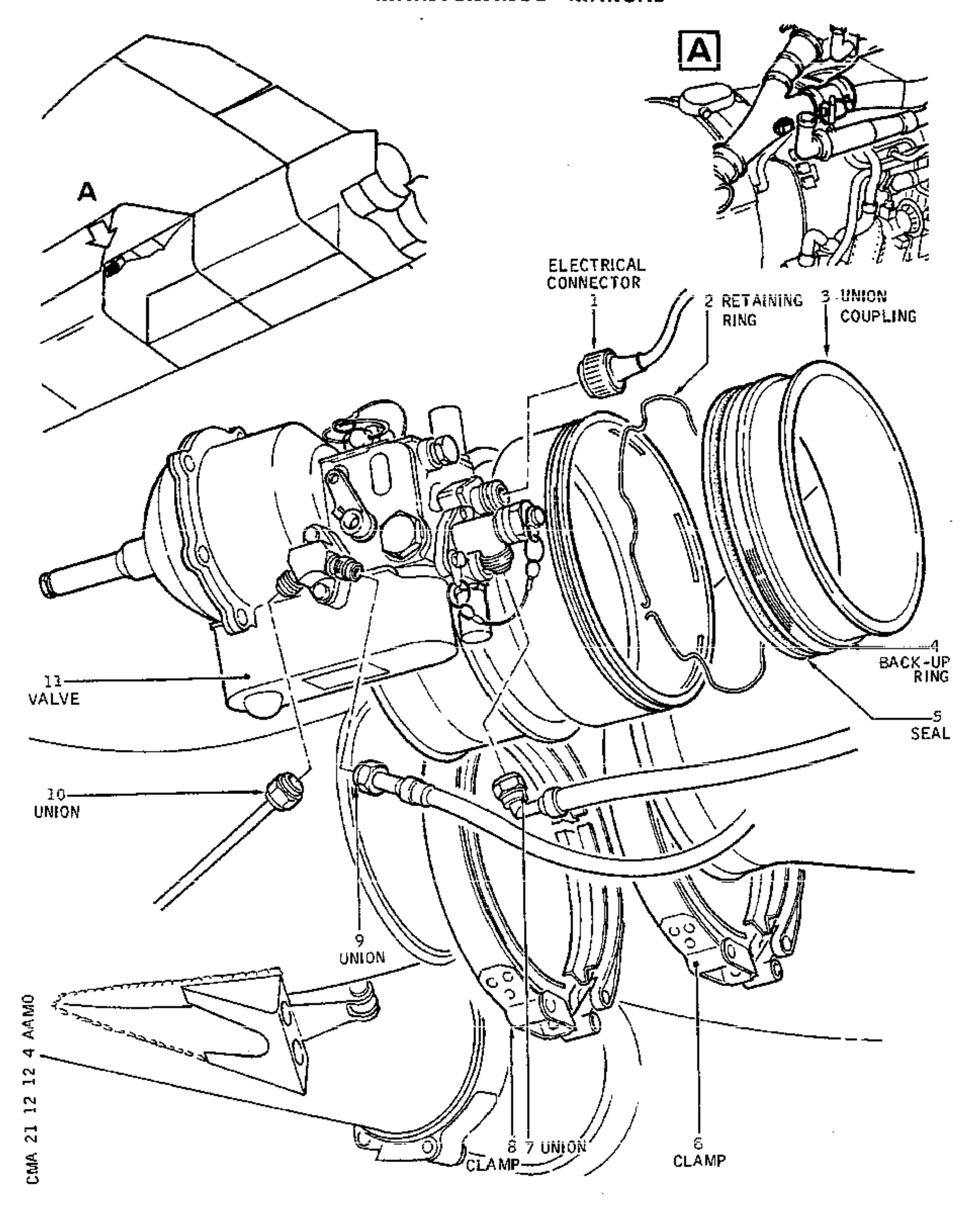
R (5) Install dust centrifuger (Ref. 21-16-12, Removal/ Installation).

R F. Test

R Ref. 21-12-12, Adjustment/Test

R G. Close-Up
R
R (1) Close access door.

R (2) Remove access platform.



Primary Heat Exchanger Ram Air Control Valve
Figure 401

R (3) Remove safety clip and tag and reset the circuit breaker tripped in paragraph 2. B. (1).

PRIMARY HEAT EXCHANGER RAM AIR CONTROL VALVE
ADJUSTMENT/TEST

1. General

The purpose of this test is to check operation of primary heat exchanger ram air control valve.

2. Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Ground Air Supply Unit - Relative minimum pressure : 2 bars, Airflow 0.4 kg/s - Relative maximum pressure : 4.5 bars, Airflow 0,6 kg/s. R - Temperature must not exceed 300°C.	
Electrical Ground Power Unit	
Circuit Breaker Safety Clips	
Blanking Caps	

B. Prepare

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing)

(2) Connect ground air supply unit.

(3) On AIR BLEED CONTROL panel, place the following switches in the positions indicated below :
BLEED VALVE in SHUT position
CROSS BLEED in SHUT position
COND VALVE in OFF position

(4) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1			
GRP1 AIR COND VALVE CLOSE	1-213	1H 612	D11

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
& AIR GEN IND			
Group 2			
GRP2 AIR COND VALVE CLOSE & AIR GEN IND	5-213	2H 612	A 9
Group 3			
GRP3 AIR COND VALVE CLOSE & AIR GEN IND	15-215	3H 612	A 3
Group 4			
GRP4 AIR COND VALVE CLOSE & AIR GEN IND	15-216	4H 612	A24

(5) Pressurize Fuel System

WARNING : OBSERVE FUEL SYSTEM SAFETY PRECAUTIONS DESCRIBED IN 28-00-00 AND 28-10-00.

NOTE : Pressurization assumes a minimum quantity of fuel of 2500 kg in the appropriate feed tank (1, 2, 3, 4).

On centre console, place throttle control levers in SHUT position (lower mechanical stop).

Check that crossfeed valves are closed and that associated magnetic indicators display vertical stripes.

With the LP VALVE switch locked at OPEN by the switch guard, check that the associated magnetic indicator shows an in-line indication.

Place the first of the three ENGINE FEED PUMPS control switches in ON position (MAIN PUMP).

Engine 1 Main Fuel Pump for group 1
" 2 " " " " " 2
" 3 " " " " " 3
" 4 " " " " " 4

Check that corresponding LOW PRESS indicator light goes off when pump operating pressure is reached.

WARNING : FUEL SYSTEM MUST NOT OPERATE MORE THAN 2

HOURS.

(6) In case Fuel System cannot be used :
Trip, Safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
For GRP 1			
LH.UC WEIGHT SW A SYS SUP	1-213	G 292	M17
For GRP 2			
LH.UC WEIGHT SW B SYS SUP	3-213	G 293	B 8
For GRP 3			
RH.UC WEIGHT SW B SYS SUP	3-213	G 294	B 9
For GRP 4			
RH.UC WEIGHT SW A SYS SUP	1-213	G 295	M18

WARNING : DURING TEST, FUEL EXCH WARNING LIGHT MAY ILLUMINATE. ON PANEL 2-214 PLACE FUEL VALVE SWITCH IN OPEN POSITION (SELF-HOLDING CANCELLATION).

(7) Open access doors :

415AL for group 1
426AR for group 2
435AL for group 3
446AR for group 4

C. Tests (Ref. Fig. 501)

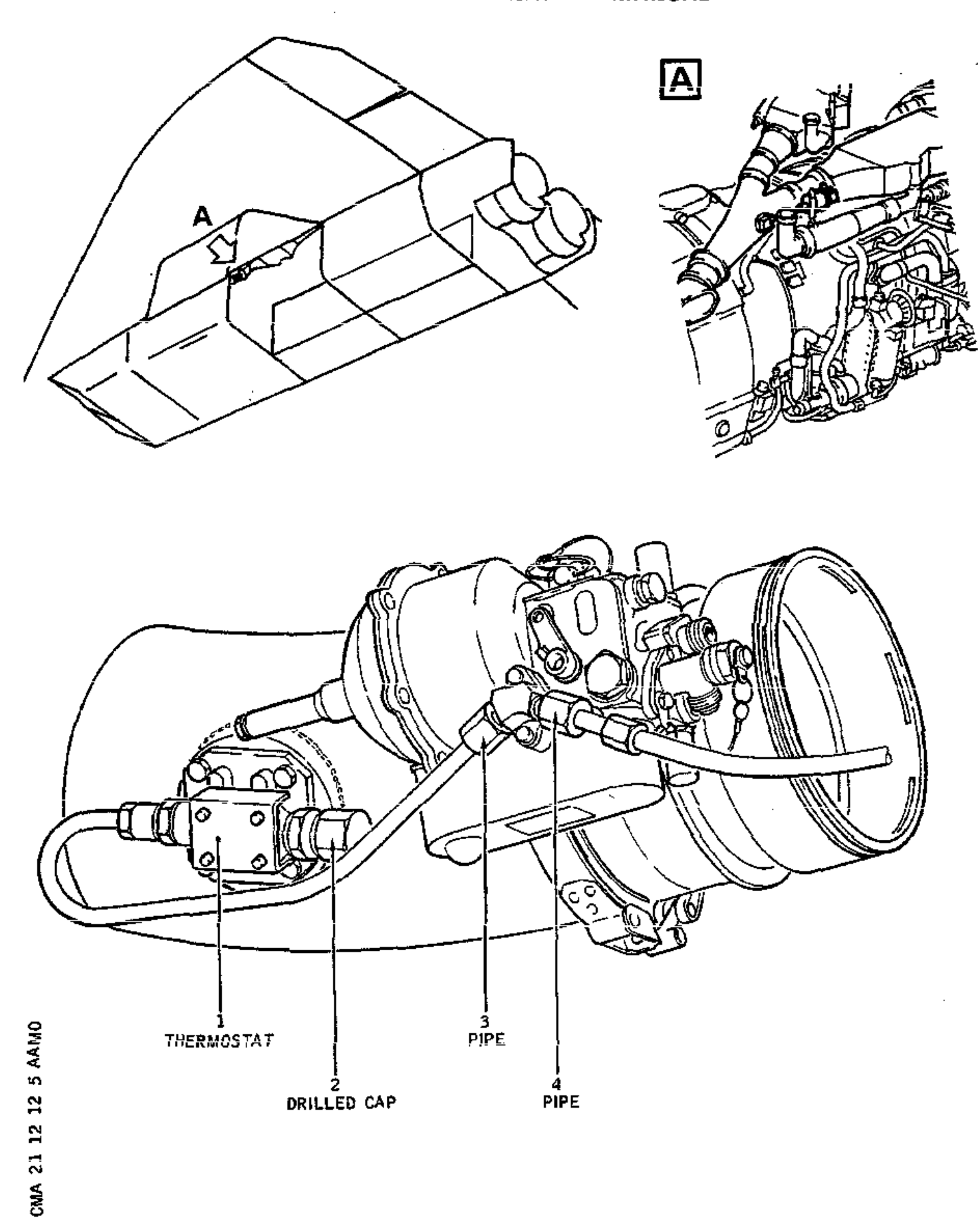
(1) Start up ground air supply unit.

(2) On AIR BLEED CONTROL panel 2-214, place CROSS BLEED switch in OPEN position and COND VALVE switch in ON position. On TEMPERATURE CONTROL panel 2-214 note temperature displayed on CAU IN.

(a) If conditioning air temperature read on CAU IN indicator is lower than 100°C :

R - On thermostat (1) located on cooling air duct,
R replace drilled cap (2) by a blanking cap.
R

- On AIR BLEED CONTROL panel 2-214, RAM AIR magnetic indicator must display a vertical stripe



Primary Heat Exchanger Ram Air Control Valve
Figure 501

- (valve closing).

- Remove blanking cap : On AIR BLEED CONTROL panel 2-214, RAM AIR magnetic indicator display horizontal stripe (valve opening).

- Screw drilled cap (2) on thermostat.

(b) If air conditioning temperature read on CAU IN indicator is greater than 100°C :

- Disconnect pipes (3) and (4) connecting valve to thermostats and cap valve couplings.

- On AIR BLEED CONTROL panel 2-214 RAM AIR magnetic indicator must display a vertical stripe (valve closing).

- Remove blanking caps : RAM AIR magnetic indicator must display a horizontal stripe (valve opening).

- Connect pipes (3) and (4) to thermostats.

(3) Shut down ground air supply unit.

(4) Place COND VALVE switch in OFF position and CROSS BLEED switch in SHUT position.

D. Close-up

(1) Disconnect ground air supply unit.

(2) Restore fuel system to initial state or remove safety clips and tags and reset the circuit breakers tripped in paragraph 2.B.(6).

(3) Close access doors opened in paragraph 2.B.(7).

RB E. Sensor Pipe Leak Check

RB (1) Disconnect servo pipe from duct connection. (Other end
RB from union 7 shown in Fig.401).

RB (2) Apply 15 psig pressure to this pipe from shop air line.
RB This will pressurise sense pipes to temperature sensors
RB as well.

RB (3) Check pipes from duct connection to ram air valve and
RB from ram air valve to ram air temperature sensor and to
RB primary heat exchanger outlet temperature sensor for
RB leakage using leak detector fluid.

RB (4) Remake leaking joints, change leaking pipes.

RB (5) Shut off and remove air line. Reconnect pipe to duct
RB connection.

RAM AIR TEMPERATURE SENSOR REMOVAL/INSTALLATION

1. General

The removal/installation procedure is identical for the sensor of each air conditioning group. The sensor is located on the primary heat exchanger ram air duct.

2. Ram Air Temperature Sensor

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 1.8 m (5 ft. 11 in.)	
Corrosion Resistant Lockwire Dia. 0.032 in. (0.8 mm)	

B. Prepare

(1) Position access platform.

(2) Open one of the following access doors :

415AL for the removal/installation of group 1 sensor
426AR for the removal/installation of group 2 sensor
435AL for the removal/installation of group 3 sensor
446AR for the removal/installation of group 4 sensor

C. Remove (Ref. Fig. 401)

(1) Remove union (1)

(2) Cut and remove lockwire, remove screws (2)

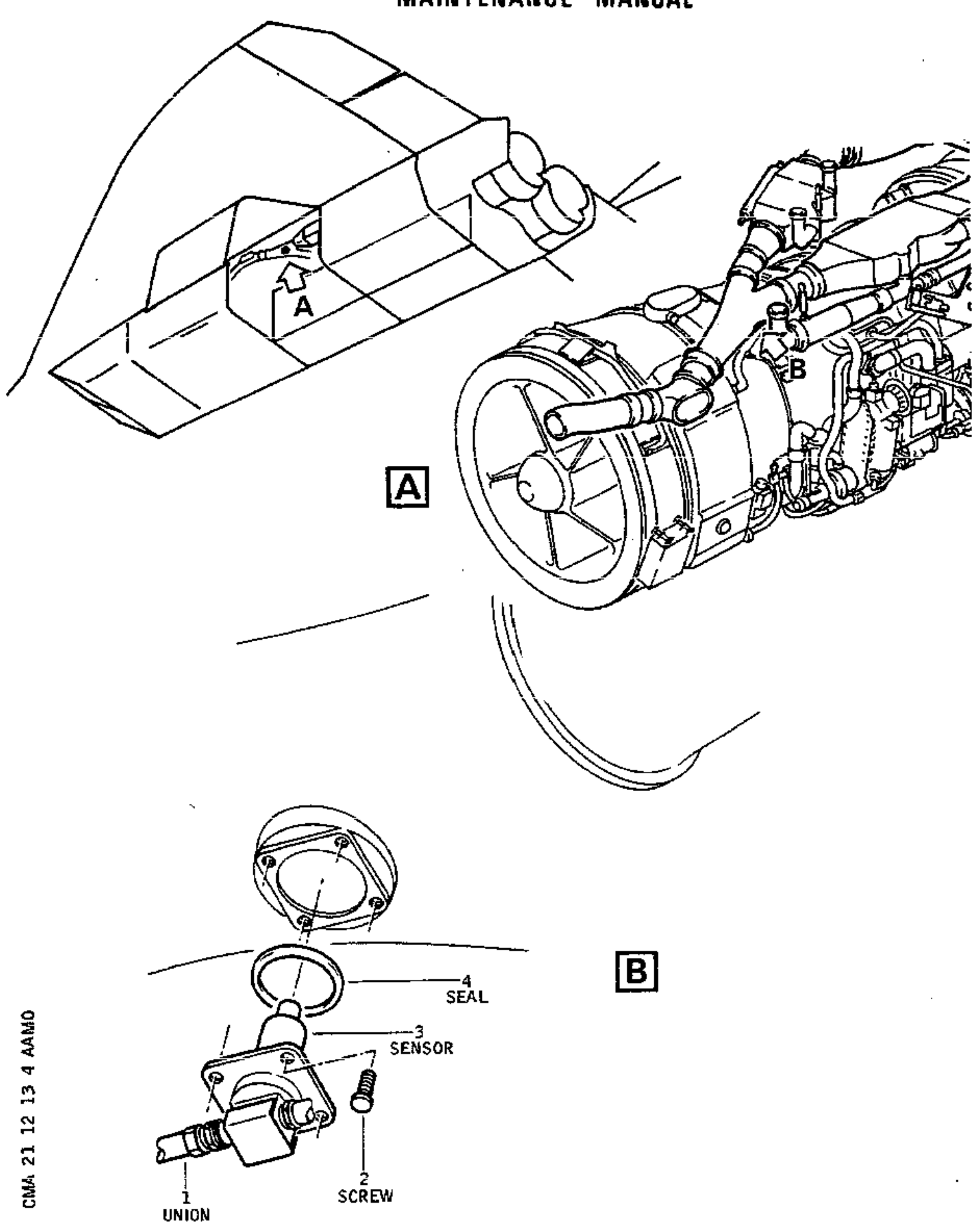
(3) Remove sensor (3) discard seal (4)

D. Install

(1) Install sensor (3) fitted with new seal (4)

(2) Install screws (2)

(3) Install union (1). Torque to between 70 and 120 lbf.in. (0.791 and 1.356 m.daN).



Ram Air Temperature Sensor
Figure 401

(4) Tighten screws (2) and wirelock.

E. Close-Up

(1) Close access door.

(2) Remove access platform.

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SECONDARY HEAT EXCHANGER - REMOVAL/INSTALLATION

1. General

The removal/installation procedure is identical for the heat exchangers of each air conditioning group. Heat exchangers are located above each engine.

2. Secondary Heat Exchanger

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 1.80 m (5 ft. 11 in.)	
Lockwire Dia. 0.7 mm (0.0276 in.)	

B. Prepare

Remove the engine (Ref. 71-00-00, Removal/Installation).

C. Remove (Ref. Fig. 401)

(1) Cut lockwires (10), remove screws (11) and insulating sleeve.

(2) Remove clamps (1), (7), (8) and (9).

(3) Remove cotter pin from nut (5) ; retain washer.

(4) Remove nut (6) ; retain washer.

(5) Hold heat exchanger.

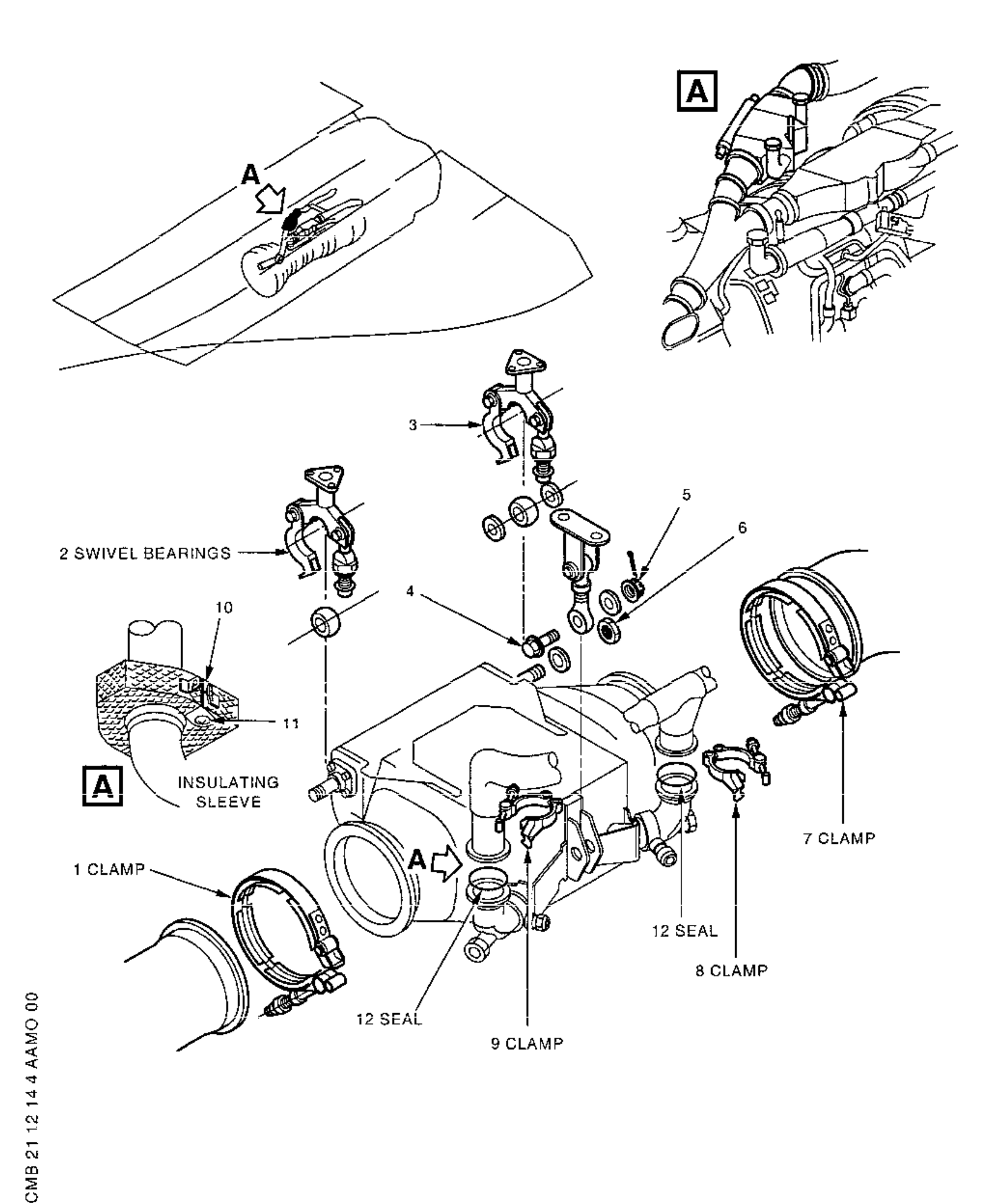
CAUTION : THE EXCHANGER WEIGHT IS 21 KG (46.30 lb.)

(6) Drive out bolt (4), let the heat exchanger rotate on the swivel bearings.

(7) Open swivel bearings (2) and (3), remove heat exchanger

D. Preparation of Replacement Component

R (1) Since the exchangers are interchangeable, check that the swivel bearing attachment fittings on the heat exchanger coincide with those on the aircraft.



Secondary Heat Exchanger
Figure 401

(2) Check condition of seals (12), discard them if necessary.

E. Install

(1) Position the heat exchanger correctly oriented in swivel bearings (2) and (3), close swivel bearings and safety securing nuts with cotter pins.

(2) Move heat exchanger upwards. Install bolt (4) washer and nut (5). Tighten nut (5). Torque to between 145 and 160 lbf in (1.64 and 1.80 mdaN) and safety with cotter pin.

(3) Install washer and nut (6).

(4) Install clamps (1) and (7).

(5) Install new seals if necessary. Install clamps (8) and (9).

<u>CAUTION</u>: CLAMPS MUST BE INSTALLED WITH GREAT CARE. TORQUE TO 53.082 lbf in (0.6 mdaN).

(6) Install insulating sleeves around clamps. Install screws (11), link insulating sleeves with lockwire (10).

R F. Secondary Heat Exchanger Exhaust Duct - Removal/
R Installation

R (1) Removal. (Ref. Fig. 402)

R (a) On secondary heat exchanger exhaust duct remove
R and retain nuts, bolts and washers from crossfeed
R pipe keep-plates.

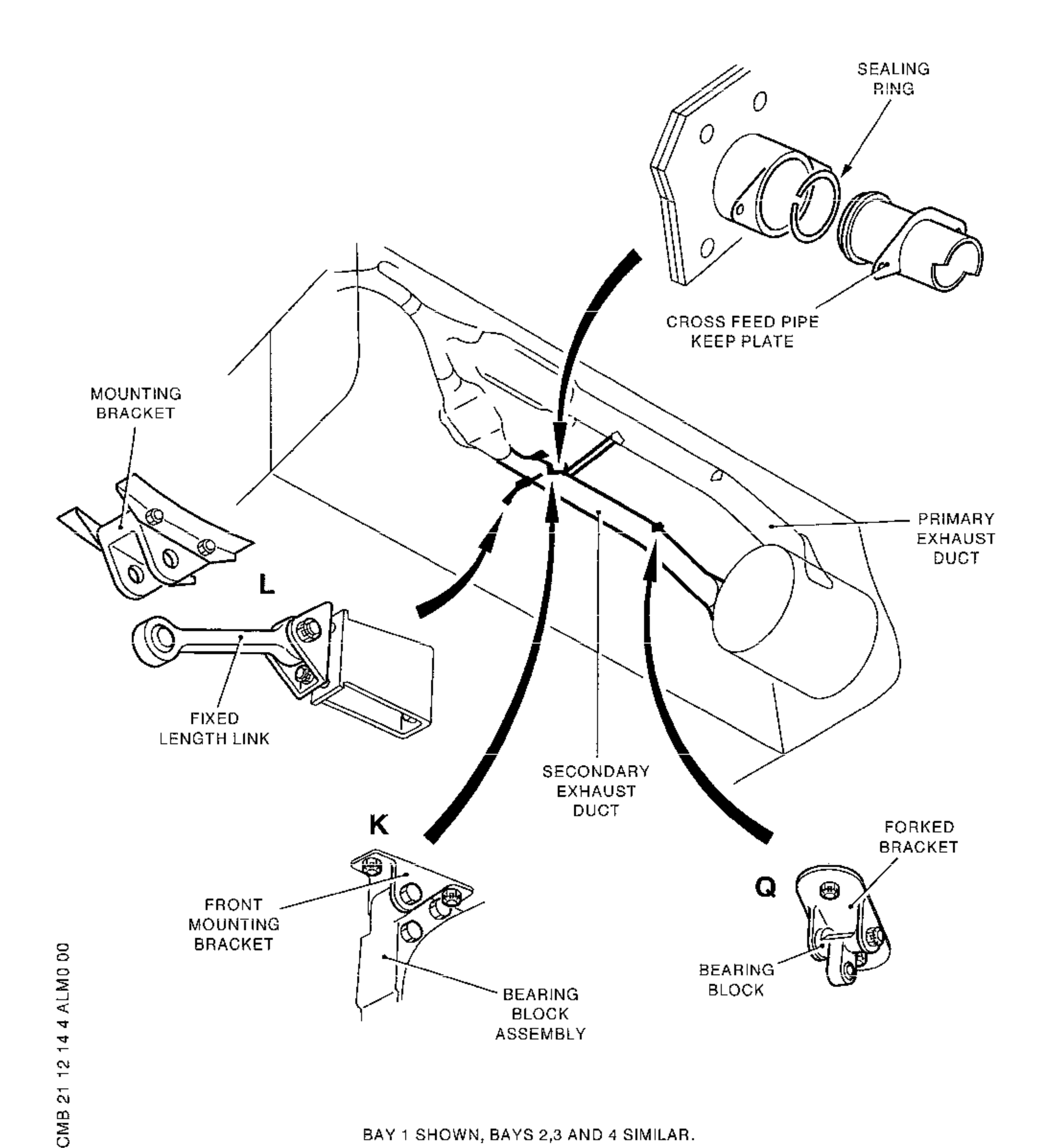
R (b) Remove and retain crossfeed pipe, sealing rings
R and keep-plates.

R (c) Support exhaust duct.

R (d) Remove the wirelocking, bolts and washers
R securing bearing block (Detail Q) to the exhaust
R duct.

R (e) Remove the split pin, nut, bolt and washers
R securing the exhaust duct front mounting bracket
R to the fixed length link (Detail L).

R (f) Remove split pin, nut, bolt and washer connecting
R bearing block assembly (Detail K) to the front
mounting bracket.



Secondary Heat Exchanger Exhaust Duct
Mounting Brackets
Figure 402

(g) Lower and remove secondary exhaust duct.

(2) Install. (Ref. Fig. 402)

(a) Connect bearing block (Detail Q) to the exhaust duct using bolt and washer. Torque tighten the bolt to between 10 and 15 lbf in (0.113 and 0.339 mdaN). Wirelock to MP13.

(b) Connect exhaust duct front mounting bracket to fixed length link (Detail L), secure with nut, bolt and washer. Torque tighten bolt to MP3. Lock with split pin.

(c) Connect front mounting bracket to bearing block assembly (Detail K), secure with nut, bolt and washer. Torque tighten bolt to MP3. Lock with split pin.

(d) Refit crossfeed pipe using sealing rings and keep plates. Secure using nuts, bolts and washers. Torque tighten bolts to MP3.

G. Test

Ref. 21-12-14, Adjustment/Test

H. Close-Up

Install engine (Ref. 71-00-00, Removal/Installation).

SECONDARY HEAT EXCHANGER - ADJUSTMENT/TEST

1. General

The purpose of this test is to check the secondary heat exchanger for evidence of leakage after a removal/installation operation. It must be carried out before engine installation.

2. Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Ground Air Supply Unit - Relative Minimum Pressure 2 bars Airflow 0.4 kg/sec. - Relative Maximum Pressure 4.5 bars Airflow 0.6 kg/sec. - Temperature must not exceed 300°C	
Blanking Plug - Engine HP Elbow Duct	D921624000
B Coupling Equipment - Ground Air Supply Unit	3BA 11377
Circuit Breaker Safety Clip	

B. Prepare

B (1) Install air bleed duct blanking plug

(2) Remove blanking plate upstream of pressure reducing shut off valve and install coupling equipment

B

(3) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(4) Connect ground air supply unit to coupling equipment.

(5) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1 GR1 LH UC WEIGHT SW	1-213	G 292	M17
Group 2 GR2 LH UC WEIGHT SW	3-213	G 293	B 8
Group 3 GR3 RH UC WEIGHT SW	3-213	G 294	B 9
Group 4 GR4 RH UC WEIGHT SW	1-2-13	G 295	M18

C. Test

(1) On AIR BLEED CONTROL panel 2-214, check that CROSS BLEED switch is in SHUT position.

(2) Start up ground air supply unit.

(3) On AIR BLEED CONTROL panel, place :

- BLEED VALVE switch in OPEN position, BLEED VALVE magnetic indicator displays a vertical stripe. Pressure indicator indicates a pressure value.
- COND VALVE switch in ON position : COND VALVE magnetic indicator displays a vertical stripe. MASS FLOW indicator indicates a certain value.

(4) Check for evidence of leakage at level of secondary heat exchanger attachment clamps.

(5) On AIR BLEED CONTROL panel, place :

COND VALVE switch in OFF position : COND VALVE magnetic indicator displays a horizontal stripe.
BLEED VALVE switch in SHUT position, BLEED VALVE magnetic indicator displays a horizontal stripe.

(6) Shut down ground air supply unit.

D. Close-Up

(1) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2 B (5).

(2) De-energize the aircraft electrical network and disconnect electrical ground power unit.

(3) Disconnect ground air supply unit.

(4) Disconnect coupling equipment and install blanking plate.

(5) Remove blanking plug.

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SECONDARY HEAT EXCHANGER - INSPECTION/CHECK

1. General

The inspection/check procedure for the secondary heat exchanger shall be carried out when engine is removed.

2. Secondary Heat Exchanger

A. Prepare (Ref. Fig. 601)

(1) Remove cooling air duct (1) upstream of the heat exchanger.

(a) Remove cotter pin, and loosen nut (2). Remove bolt (3), and release link rod (4).

(b) Remove clamps (5) and (6).

(c) Remove duct (1).

B. Inspection/Check

(a) Check that secondary heat exchanger is free from dust and foreign bodies.
Clean it if necessary.

(b) If the heat exchanger is damaged or blocked, replace it (Ref. 21-12-14, Removal/Installation).

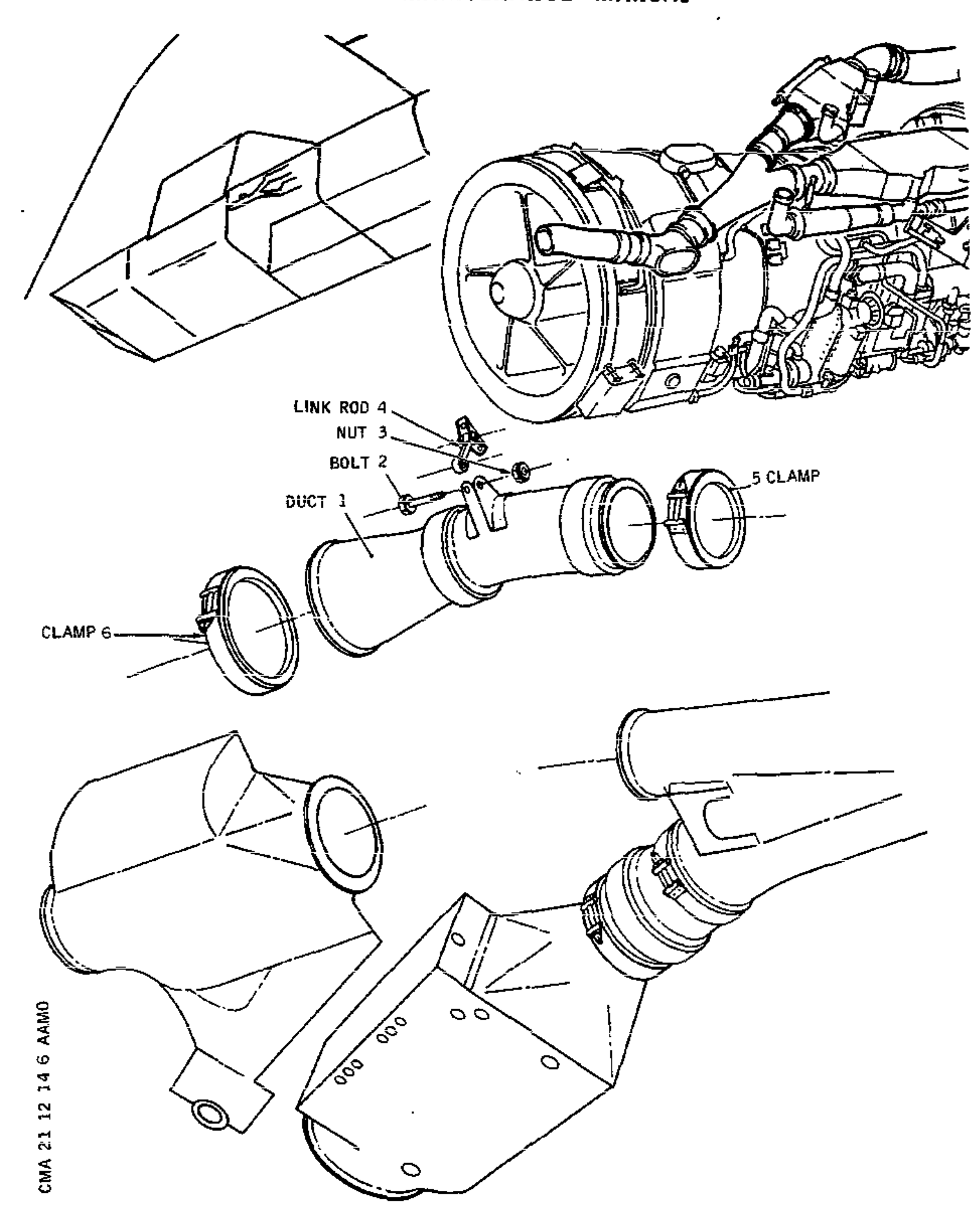
C. Close-Up

(1) Remove cooling air duct (1) upstream of heat exchanger.

(a) Install duct (1) by means of clamps (5) and (6), without tightening them.

(b) Install link rod (4) with aid of bolt (3) and nut (2).

(c) Tighten clamps (5) and (6), and nut (2). Safety nut with cotter pin.



Secondary Heat Exchanger
Figure 601

OVERHEAT DETECTOR - REMOVAL/INSTALLATION

1. General

The removal installation procedure of overheat detectors is identical for each group.

2. Overheat Detector

A. Equipment and Materials.

DESCRIPTION	PART NO.
Access platform 3.45 (11 ft. 4 in.)	
Circuit breaker safety clips	

B. Prepare

(1) Open access doors

415 AL for group 1 overheat detector
426 AR for group 2 overheat detector
435 AL for group 3 overheat detector
446 AR for group 4 overheat detector

R (2) Trip, safety and tag the following circuit breakers.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1			
GR1/FUEL VALVE CONT	2-213	1H 863	D16
AIR/COND VALVE CLOSE & AIR GEN IND	1-213	1H 612	D11
Group 2			
GR2/FUEL VALVE CONT	4-213	2H 863	E12
AIR/COND VALVE & AIR GEN IND	5-213	2H 612	A 9
Group 3			
GR3/FUEL VALVE CONT	2-213	3H 863	F16
AIR/COND VALVE & AIR	15-215	3H 612	A 3

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GEN IND			
Group 4			
GR4/FUEL VALVE CONT	4-213	4H 863	B11
AIR/COND VALVE & AIR GEN IND	15-216	4H 612	A24

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1)

(2) Remove screws (2)

(3) Remove overheat detector (3)

D. Install

(1) Install overheat detector (3)

(2) Install screws (2)

(3) Connect electrical connector (1)

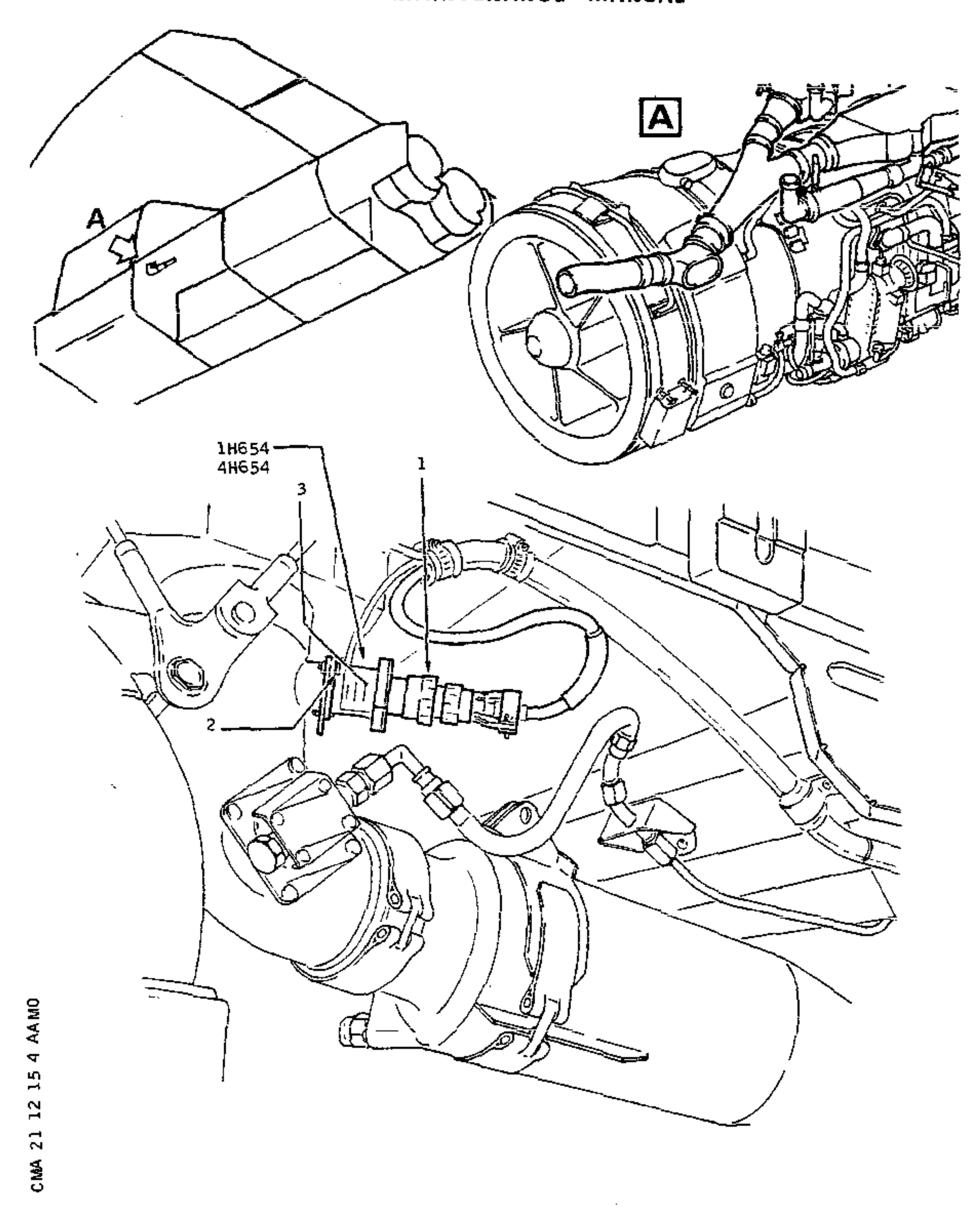
E. Close up

(1) Close access doors

(2) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2 B (2).

R F. Test

R Carry out the test procedure described in 21-10-00,
R Adjustment/Test, paragraphs 2A-2B-3B-3F (4) (5) (6)
R 3H.



R
Overheat Detector
Figure 401

COLD AIR UNIT ABSOLUTE PRESSURE SWITCH REMOVAL/INSTALLATION

1. General

The removal/installation procedure is identical for the pressure switch of each group. The pressure switches are located on the LH side of No. 1 and No. 3 engines, and on the RH side of No. 3 and No. 4 engines.

2. Cold Air Unit Absolute Pressure Switch

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 1.8 m (5 ft. 11 in.)	
Circuit Breaker Safety Clips	

B. Prepare

(1) Trip, safety and tag one of the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1			
GRP 1 AIR GEN CONT & IND	1-213	1H 862	D13
Group 2			
GRP 2 AIR GEN CONT & IND	5-213	2H 862	F 9
Group 3			
GRP 3 AIR GEN CONT & IND	15-215	3H 862	B 3
Group 4			
GRP 4 AIR GEN CONT & IND	15-216	4H 862	B23

(2) Position access platform.

(3) Open one of the following access doors :

415AL for removal of group 1 pressure switch
426AR for removal of group 2 pressure switch
435AL for removal of group 3 pressure switch

446AR for removal of group 4 pressure switch

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1).

(2) Disconnect union (2).

(3) Loosen the 3 screws (3).

(4) Remove pressure switch (4).

D. Install

(1) Install pressure switch (4) and attach it by means of the three screws (3).

(2) Connect union (2). Torque to between 70 and 120 lbf.in. (0.791 and 1.356 m.daN).

(3) Tighten screws (3).

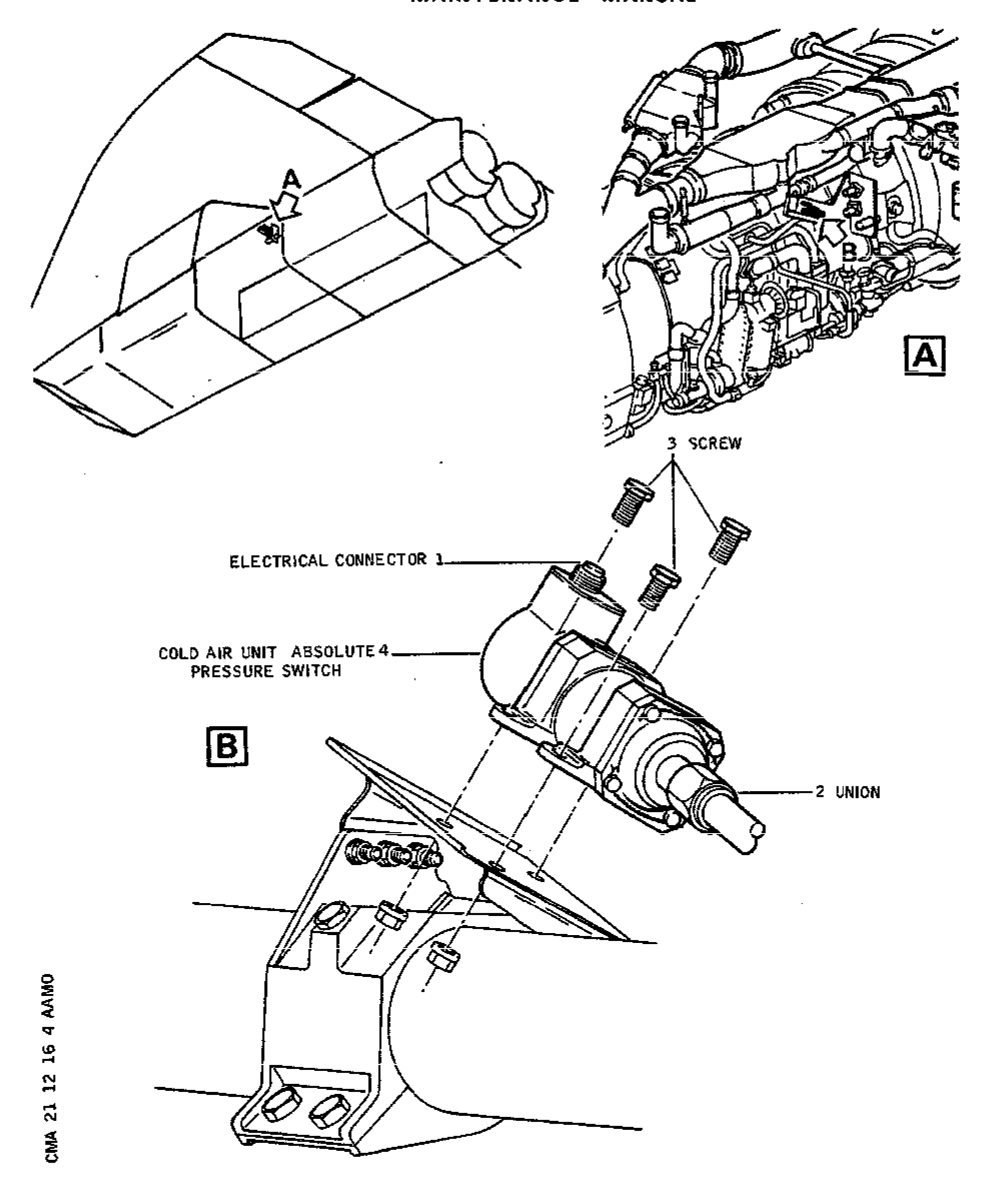
(4) Connect electrical connector (1).

E. Close-Up

(1) Close access door.

(2) Remove access platform.

(3) Remove safety clip and tag, and reset the circuit breaker tripped in paragraph 2.B.(1).



Cold Air Unit Absolute Pressure Switch
Figure 401

PRIMARY HEAT EXCHANGER THERMOSTAT - REMOVAL/INSTALLATION

1. General

R The removal/installation procedure of the thermostats is identical for each group.

2. Primary Heat Exchanger Thermostat

A. Equipment and Materials

DESCRIPTION	PART NO.
Wing Protective Mats	
R Corrosion Resistant Steel	
R Lockwire Dia. 0.8 mm (0.032 in.)	

B. Prepare

R (1) Open one of the following access doors :

R 534 AT for group 1 thermostat
R 533 BT for group 2 thermostat
R 633 BT for group 3 thermostat
R 634 AT for group 4 thermostat

C. Remove (Ref. Fig. 401)

(1) Disconnect pipe (1).

(2) Remove lockwire from screws (2) and remove the screws.

(3) Remove thermostat (3) from pipe and discard seal (4).

D. Install

(1) Install thermostat (3) fitted with a new seal (4).

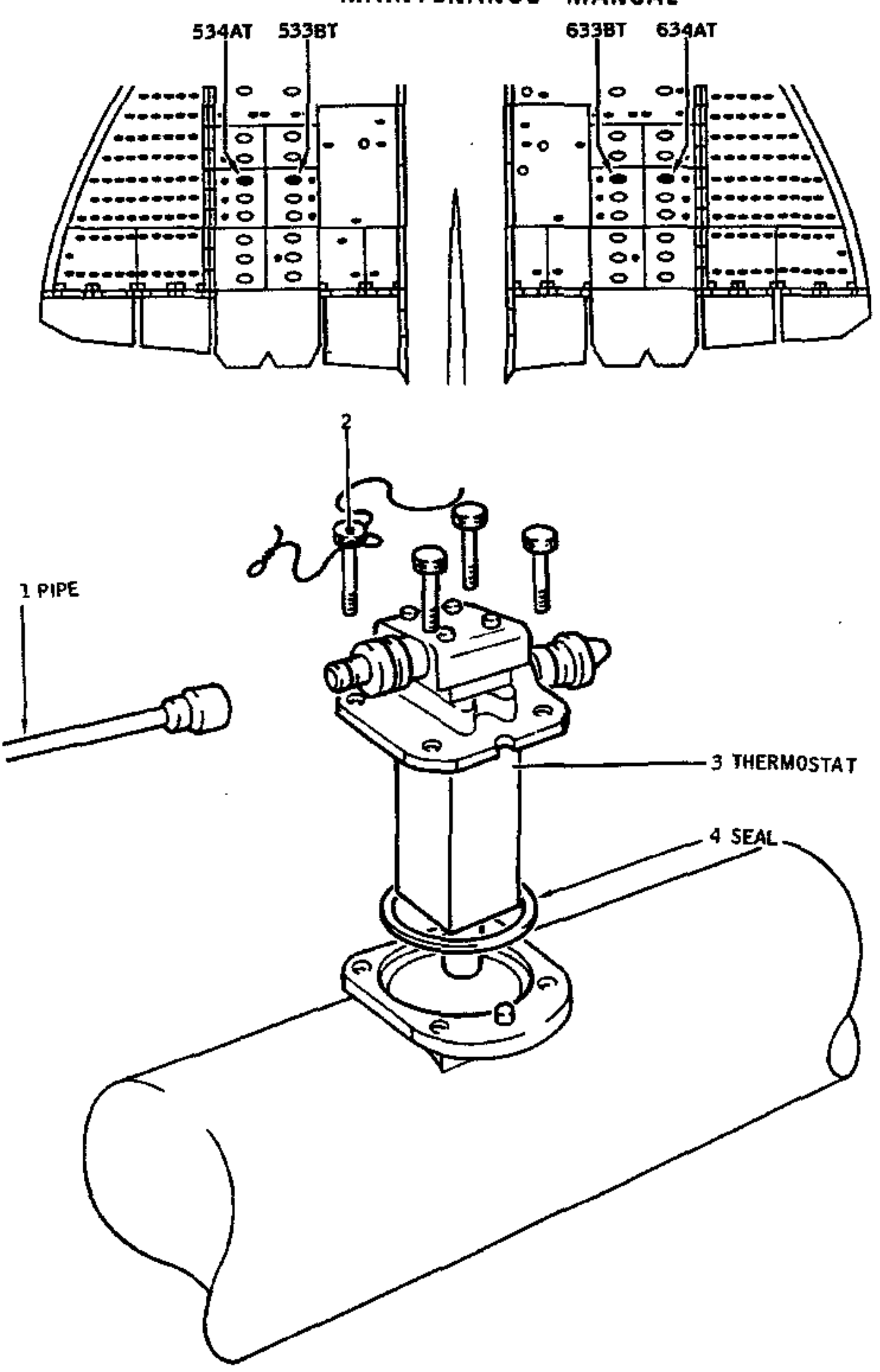
(2) Install screws (2) and wirelock.

(3) Connect pipe (1).

E. Close-Up

(1) Close access door.

(2) Remove wing protective mats.



R

Primary Heat Exchanger Thermostat
Figure 401

SECONDARY HEAT EXCHANGER OVERHEAT DETECTOR - REMOVAL/INSTALLATION

1. General

The removal/installation procedure of overheat detectors is identical for each group.

2. Overheat Detector

A. Equipment and Materials.

DESCRIPTION	PART NO.
R Circuit Breaker Safety Clips	
Access platform	

B. Prepare

(1) Open access doors

534 AT for group 1 overheat detector
533 BT for group 2 overheat detector
633 BT for group 3 overheat detector
634 AT for group 4 overheat detector

R (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1			
GR1 FUEL VALVE CONT	2-213	1H 863	D16
AIR COND VALVE CLOSE AND AIR GEN IND	1-213	1H 612	D11
Group 2			
GR2 FUEL VALVE CONT	4-213	2H 863	E12
AIR COND VALVE CLOSE AND AIR GEN IND	5-212	2H 612	A 9
Group 3			
GR3 FUEL VALVE CONT	2-213	3H 863	F16
AIR COND VALVE CLOSE	15-215	3H 612	A 3

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
AND AIR GEN IND			
Group 4			
GR4 FUEL VALVE CONT	4-213	4H 863	B11
AIR COND VALVE CLOSE AND AIR GEN IND	15-216	4H 612	A24

C. Removal (Ref. Fig. 401)

(1) Disconnect electrical connector (1)

(2) Remove screws (2)

(3) Remove overheat Detector (3)

D. Install

(1) Install overheat detector (3)

(2) Install screws (2)

(3) Connect electrical connector (1)

E. Close Up

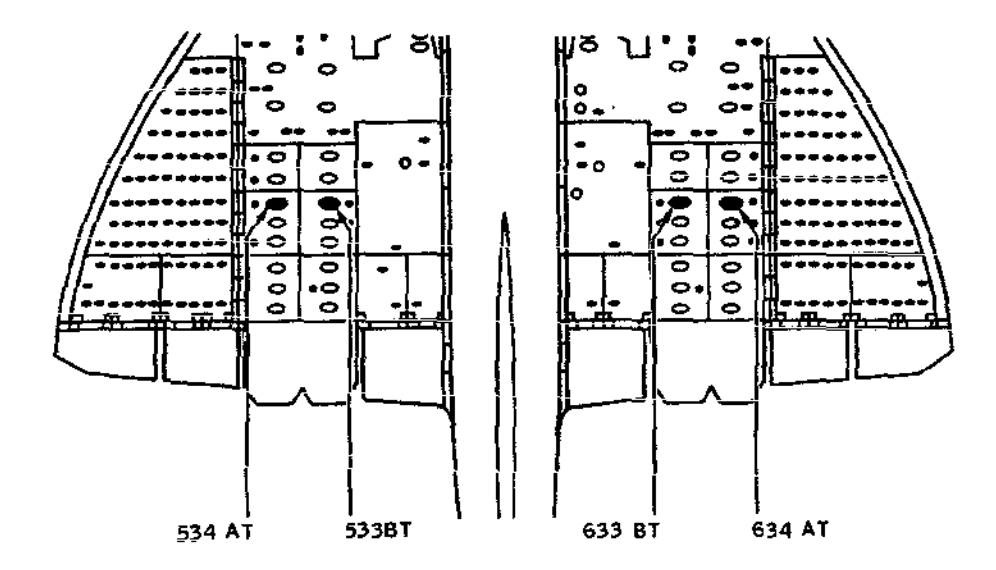
(1) Close access doors

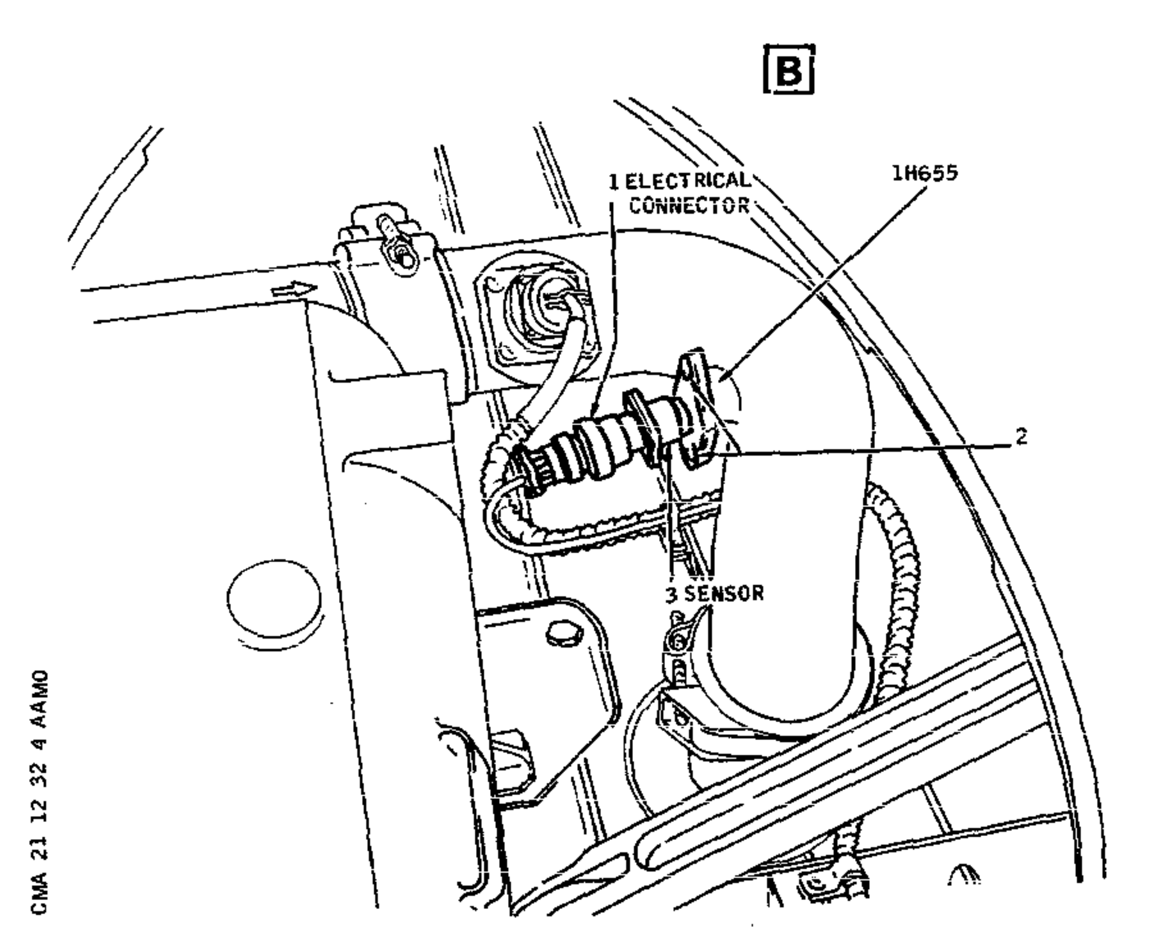
R (2) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2 B (2).

R F. Tests

R Carry out the test procedures described in 21-10-00,
R Adjustment/Test, paragraphs 2A-2B-3B (1) (2) (3) (4)
R 3C-3F (4) (5) (6) 3H.

Printed in England





R

Overheat Detector
Figure 401

FUEL HEAT EXCHANGER - REMOVAL/INSTALLATION

1. General

The removal/installation procedure is identical for the fuel heat exchanger of each air conditioning group.

2. Fuel Heat Exchanger

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Electrical Ground Power Unit	
Fuel Recovery Container	

B. Prepare

(1) Connect electrical ground power unit and energize
R the aircraft electrical network (Ref. 24-41-00,
R Servicing).

R (2) On FUEL MANAGEMENT panel, check on LP VALVE indicator
R light that fuel shut off valve of associated engine
R is closed.

(3) De-energize the aircraft electrical network
R (Ref. 24-41-00, Servicing).

(4) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GROUP 1			
ENG 1 FIRE SHUT OFF VALVE	2-213	W 13	F15
ENG 1-2 FIRE SHUT OFF VALVE IND	15-216	W 5	C18
TANK 1 NORM LPS/OFF VALVE SUPPLY		1Q 1	C 1
GROUP 2			

SERVICE	PANEL	CIRCUIT BREAKER		MAP REF.
ENG 2 FIRE SHUT OFF VALVE	2-213	W	7	B15
ENG 1-2 FIRE SHUT OFF VALVE IND	15-216	W	5	C18
TANK 2 NORM LPS/OFF VALVE SUPPLY	3-213	2Q	1	A 5
GROUP 3				
ENG 3 FIRE SHUT OFF VALVE	2-213	W	4	A15
ENG 1-2 FIRE SHUT OFF VALVE IND	15-216	W	6	C19
TANK 3 NORM LPS/OFF VALVE SUPPLY	3-213	3Q	1	A 6
GROUP 4				
ENG 4 FIRE SHUT OFF VALVE	2-213	W	8	G15
ENG 3-4 FIRE SHUT OFF VALVE IND	15-216	W	6	C19
TANK 4 NORTH LPS/OFF VALVE SUPPLY		4Q	1	C 2

(5) On nacelle open access doors ;

415AB for engine 1
426AB for engine 2
435AB for engine 3
446AB for engine 4

(6) Remove drain plug located under engine fuel supply filter and drain fuel in recovery container.

(7) Remove air vent plugs from recirculation valves.

(8) On wing, open access doors ;

532CT, 534AT, 534CT for group 1 heat exchanger.
531BT, 533BT, 633DT for group 2 heat exchanger.
631BT, 633BT, 633DT for group 3 heat exchanger.
632CT, 634AT, 634CT for group 4 heat exchanger.

(9) Trip, safety and tag the following circuit breakers ;

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GROUP 1			
GRP 1 FUEL VALVE CONT	2-213	1H 863	D16
GRP 1 TEMP SELECTOR AUTO SUP & CONT		H1000	B17
GROUP 2			
GRP 2 FUEL VALVE CONT	4-213	2H 863	E12
GRP 2 TEMP SELECTOR AUTO SUP & CONT		H1001	E11
GROUP 3			
GRP 3 FUEL VALVE CONT	2-213	3H 863	F16
GRP 3 TEMP SELECTOR AUTO SUP & CONT		H1002	G16
GROUP 4			
GRP 4 FUEL VALVE CONT	4-213	4H 863	B11
GRP 4 TEMP SELECTOR AUTO SUP & CONT		H1003	B12

C. Remove (Ref. Fig.401 and 402)

(1) Remove air inlet duct (4).

(a) Disconnect electrical connectors (5) and (6).

(b) Remove nut, pin, washers securing rod (7).

(c) Remove bonding strip.

(d) Remove clamps (3) and (8) and duct (4).

(2) Remove clamp from air outlet duct (15).

(a) Disconnect unions (14) and (10).

(b) Disconnect rods (13) and (11) (on duct side).

(c) Remove clamps (9) and (16).

(d) Remove duct located near heat exchanger.

(3) Remove fuel heat exchanger (18).

(a) Disconnect bonding strip (17).

(b) Disconnect duct (2).

(c) Remove nut and special washer (20) forward of rib 66.

(d) Remove lower nuts and bolts (21).

R (e) Pull and remove heat exchanger (18).

R (f) Remove nut, washer and bolt (19) securing link rod
R and its support (1) from removed heat exchanger.

D. Preparation of Replacement Component

R (1) Install new seals on heat exchanger.

(2) Install link rod and its support (1) on replacement heat exchanger ; secure link rod with bolt, washer and nut (19).

E. Install

(1) Install fuel heat exchanger (18).

(a) Position heat exchanger.

(b) Install bolts, washers and nuts (21).

(c) Install special washer and nut (20). Tighten.

(d) Connect duct (2).

(e) Connect bonding strip (16).

(2) Install air outlet duct (15).

(a) Remove lockwire and loosen swivel union (12).

(b) Install clamps (16) and (9) without locking them.

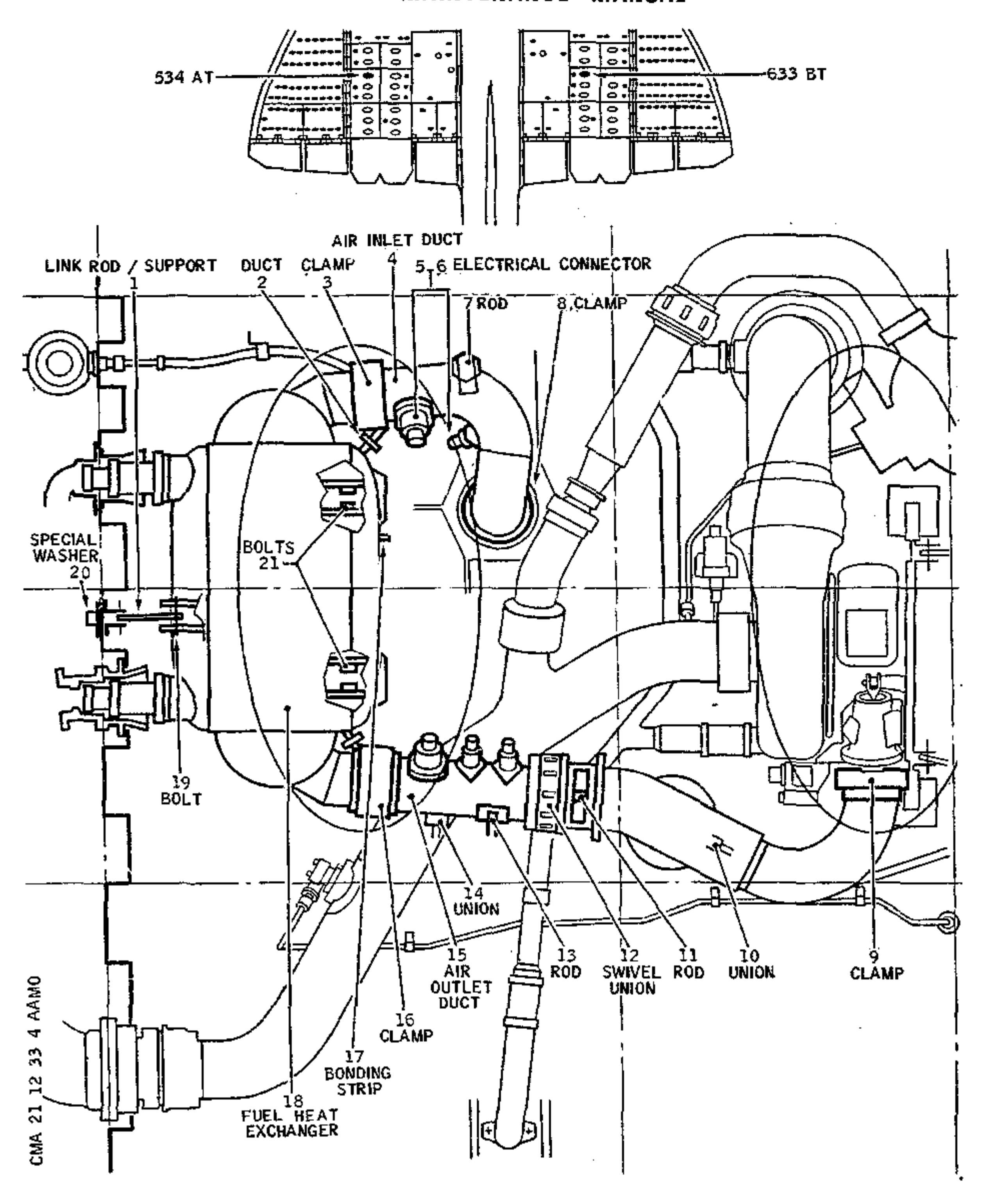
(c) Connect rods (11) and (13).

(d) Screw swivel union (12) until duct reaches clamp (16). Wirelock clamp.

(e) Tighten clamps (16) and (9).

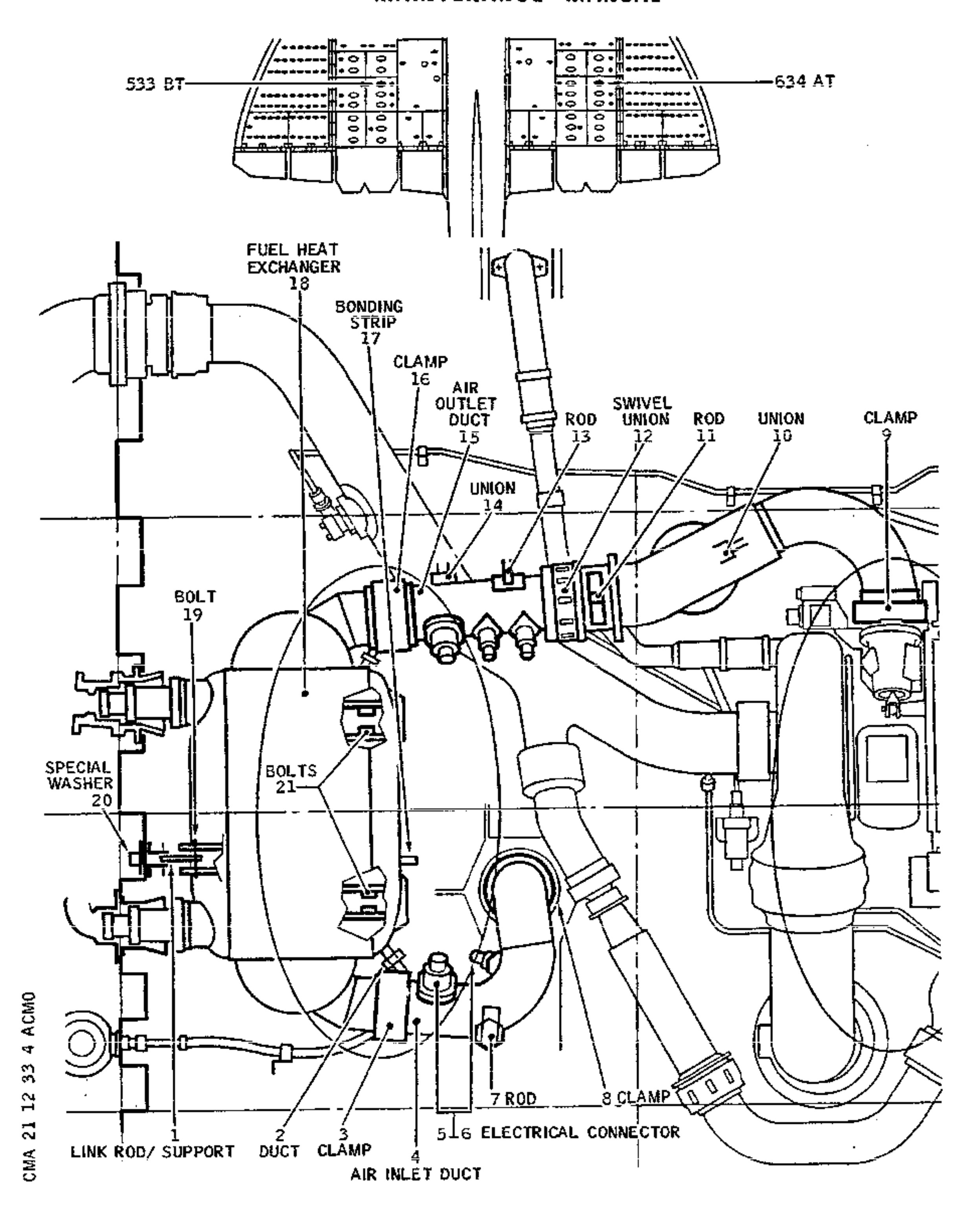
(f) Connect unions (14) and (10).

(3) Install air inlet duct (4).



Fuel Heat Exchanger - Group 1 or 4
Figure 401

R



Fuel Heat Exchanger - Group 2 or 3
Figure 402

R

(a) Install duct (4).

R (b) Install clamps (3) and (8). Do not tighten at this
R stage.

(c) Connect rod (7) ; install bonding strip under head of bolt securing rod.

(d) Tighten clamps (3) and (8).

(e) Connect electrical connectors (5) and (6).

R (4) Install drain and air vent plugs.

R F. Test

R Ref. 21-12-33, Adjustment/Test

R G. Close-Up
R

R (1) Reset the circuit breakers tripped in paragraphs 2. b. (4) and 2. B. (9).

R (2) Restore fuel system to initial configuration.

R (3) Close access doors.

FUEL HEAT EXCHANGER - ADJUSTMENT/TEST

1. General

The purpose of this test is to check the fuel heat exchanger for leakage after a removal/installation procedure.

2. Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Ground Air Supply Unit - Relative Minimum Pressure : 2 bars Minimum Airflow : 0.4 kg/s - Relative Maximum Pressure : 4.5 bars Maximum Airflow : 0.6 kg/s The temperature must not exceed 300°C	
Circuit Breaker Safety Clips	

B. Prepare

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(2) Connect ground air supply unit.

(3) On AIR BLEED CONTROL panel 2-214, check that the following switches are in the position indicated below :

- BLEED VALVE switch in SHUT position
- CROSS BLEED switch in SHUT position
- COND VALVE switch in OFF position

(4) Place FUEL VALVE switch in OPEN position then in SHUT position. Check that the fuel control valve position changes on FUEL VALVE magnetic indicator (time delay). Place switch back to the AUTO position.

(5) It is required that an observer be under the nacelle and connected to the flight compartment by telephone.

(6) Trip, safety and tag the air start valves circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 1 & 4 AIR START CONT	15-215	K 181	C 15
ENG 2 & 3 AIR START CONT	15-216	K 182	C11

WARNING : BEFORE STARTING THE TEST, MAKE CERTAIN THAT IN ENGINE ZONE, THE AIR START VALVES ARE CLOSED ; THE POSITION INDICATOR OF THE MANUAL CONTROL MUST BE PLACED IN SHUT POSITION.

(7) On FUEL MANAGEMENT panel 5-214, pressurize the fuel supply system of corresponding Cold Air Unit.
Check on level indicator that the minimum quantity of fuel is 2500 kg in the appropriate feed tank. Two out of the three ENGINE FEED PUMP switches associated with each feed tank are in ON position.
The corresponding LOW PRESS caption light goes off within 3 seconds.

C. Test

(1) Start up ground air supply unit.

(2) On AIR BLEED CONTROL panel 2-214, place CROSS BLEED switch in OPEN position and COND VALVE switch in ON position.
On TEMPERATURE CONTROL panel 2-214, a flow indication is displayed on MASS FLOW indicator.

(3) Check for leakage at level of fuel heat exchanger (check that fuel does not mix with air).

(4) On AIR BLEED CONTROL panel 2-214, place COND VALVE switch in OFF position and CROSS BLEED switch in SHUT position.

(5) Shut down ground air supply unit.

D. Close-Up

(1) Disconnect ground air supply unit.

(2) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2. B (6).

(3) Restore fuel system to initial state.

(4) De-energize the aircraft electrical network and disconnect electrical ground power unit.

FUEL HEAT EXCHANGER - INSPECTION/CHECK

1. General

Check for evidence of leakage in the fuel heat exchanger interspace.

2. Fuel Heat Exchanger

A. Equipment and Materials

DESCRIPTION	PART NO.
R Coupling Adaptor - Testing Air Conditioning	D921602000
Nitrogen or Air Supply Unit Supplying a pressure greater than or equal to 2 bars	
Pressure Gauge	

B. Prepare

(1) Open access doors :
532CT : for check of group 1 heat exchanger
531BT : for check of group 2 heat exchanger
631BT : for check of group 3 heat exchanger
632CT : for check of group 4 heat exchanger

C. Check for Fuel Leaks

Check for fuel leaks in drip container.

In the drip container a plunger enables the fuel or the condensation water which could be in the fuel heat exchanger interspace to be expelled outside.

D. Pressure Check (Ref. Fig. 601)

(1) Remove test connector blanking plug.

(2) Connect test set-up to test connector by means of
R coupling adaptor D921602020.

(3) Set a pressure of 1.5 ± 0.1 bar (21.75 ± 1.45 psi).

NOTE : Do not exceed this pressure.

PRESSURE GAUGE

FUEL HEAT EXCHANGER

IN SITU TEST CONNECTOR + ADAPTOR

COMPRESSED AIR OR NITROGEN SUPPLY UNIT

AIR VENT

DRIP CONTAINER

CMA 21 12 33 6 AAM0

Test Set Up
Figure 601

(4) Shut down compressed air supply unit. Pressure drop
RB must not exceed 100 mb/min (1.45 psi/min).

(5) Open air vent valve and remove test set-up.

(6) Blank off test connector.

E. Close-Up

Close access doors.

SEAL RETAINER ASSEMBLY - REMOVAL/INSTALLATION

1. General

The seal retainer assemblies are installed in the pressure seals located between the engine nacelle and the wing area above each nacelle.
R Removal and installation of the seal retainer assembly requires
R the removal of the pressure seals.
This removal operation is carried out with the engine and air conditioning duct (above each nacelle) removed.

2. Seal Retainer Assembly

A. Equipment and Materials

DESCRIPTION	PART NO.
Special Product (Ref. 20-30-00, No.104)	
Special Products (Ref. 20-30-00, No.105)	
Sealant (Ref. 20-30-00, No.351)	

B. Prepare

C. Remove (Ref. Fig. 401)

(1) In the wing

(a) Remove clamp (1)

(b) Unscrew bolt (10) and remove gaiter (2)

(c) Remove retainer ring (9)

(2) In the nacelle :

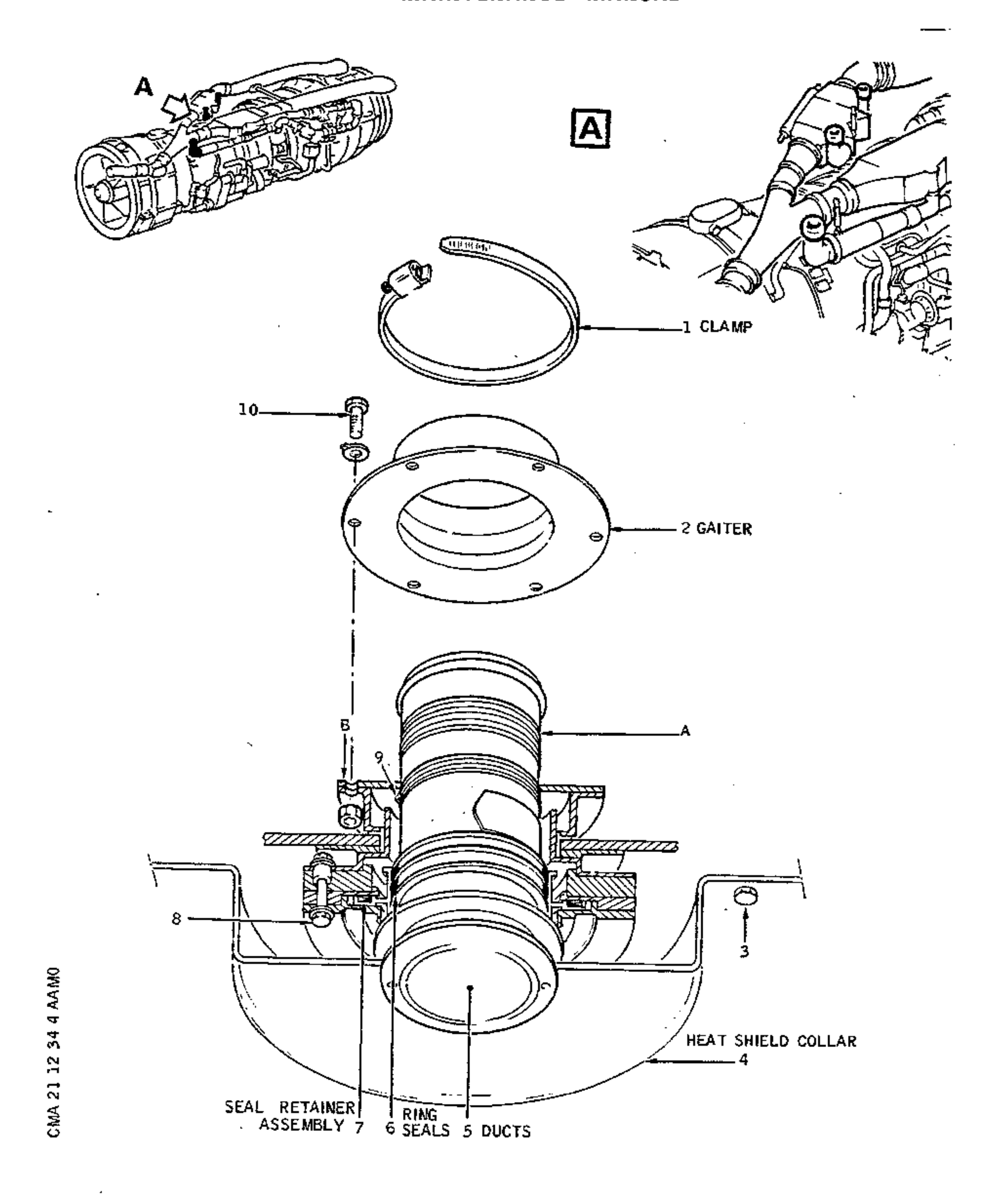
To remove the pressure seals of the secondary heat exchanger, remove nuts (3) and heat shield collar (4).

R (a) Pull downwards and remove duct (5).

(b) Remove bolt (8) and withdraw seal retainer assembly (7).

D. Install

Printed in England



Seal Retainer Assembly
Figure 401

(1) In the nacelle

(a) Install seal retainer assembly (7) using bolt (8)

(b) Lubricate ring seals (6) with Product No.104 or
R 105. Engage duct (5) in seal retainer assembly.
R

(2) In the wing

(a) Install retainer ring (9)

(b) Install gaiter (2) (Surfaces A and B must be coated with Product No.351).

(c) Install bolt (10).

(d) Install clamp (1).

COLD AIR UNIT - REMOVAL/INSTALLATION

1. General

The removal installation procedure of cold air unit is identical for each air conditioning group.

2. Cold Air Unit

A. Equipment and Materials

	DESCRIPTION	PART NO.
R	Access Platform, 3.220 m (10.7 ft)	
	Circuit Breaker Safety Clips	
	Protective Mats	
	Oil (Ref. 20-30-00, No.022)	
R	Lockwire 1.40 mm (0.055 in.)	
	Adjusting Shim and Gauge	E920692000

B. Prepare

(1) Position access platform and protective mats.

(2) On wing, open access doors :
534AT and 534CT for removal of group 1 Cold Air Unit
533BT and 533DT for removal of group 2 Cold Air Unit
633BT and 633DT for removal of group 3 Cold Air Unit
634AT and 634CT for removal of group 4 Cold Air Unit

(3) Trip, safety and tag one of the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1 GRP 1 AIR GEN CONT & IND	1-213	1H 862	D13
Group 2 GRP 2 AIR GEN CONT & IND	5-213	2H 862	F 9

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 3 GRP 3 AIR GEN CONT & IND	15-215	3H 862	B 3
Group 4 GRP 4 AIR GEN CONT & IND	15-216	4H 862	B23

C. Remove (Ref. Fig.402 and 403)

(1) Remove clamps (4) and (19).

(2) Remove union (21).

(3) Remove nut, bolt, washer ; hold link rod (24) (on duct side).

(4) Remove union (3).

(5) Remove duct (7) from cold air unit.

(6) Remove unions (1) (5) and (9).

(7) Unlock and remove swivel joint (2).

(8) Remove clamps (10) and (8).

(9) Remove nut, bolt, washer ; hold link rod (6) (on duct side).

(10) Remove compressor inlet duct from cold air unit.

(11) Remove clamps ; hold union (23) sleeve ; push back sleeve ; remove both heat insulating half rings ; unscrew union (23).

(12) Remove clamps (14) ; push back sleeve (12) ; unlock heat insulating half rings (13) ; remove them. Unlock screws (11), and remove them. Discard seal (25).

(13) Remove electrical connector (20).

(14) Remove bonding strip (16).

R (15) Unlock and remove screw (15).

(16) Remove bolts (17). Remove rods (18).

RB (17) Remove cold air unit (22) from turbine outlet duct
RB and remove from aircraft.

RB (18) Remove filler cap and seal.

RB (19) Drain oil from unit and fill sample bottle, Part No.
RB GZAC2776.

RB (20) Replace filler cap and seal. TIGHTEN BY HAND ONLY.

RB (21) Place unit with shaft horizontal and fill plug
RB uppermost on storage rack or in packing case.

RB NOTE: Packing case MPCW6023 must be used for
RB transport and storage.

RB (22) Complete sample bottle label with the following
RB details:

RB (a) Part number.

RB (b) Serial number.

RB (c) Aircraft Registration and Date.

RB (23) Place sample bottle upright in packing case for
RB dispatch with the cold air unit.

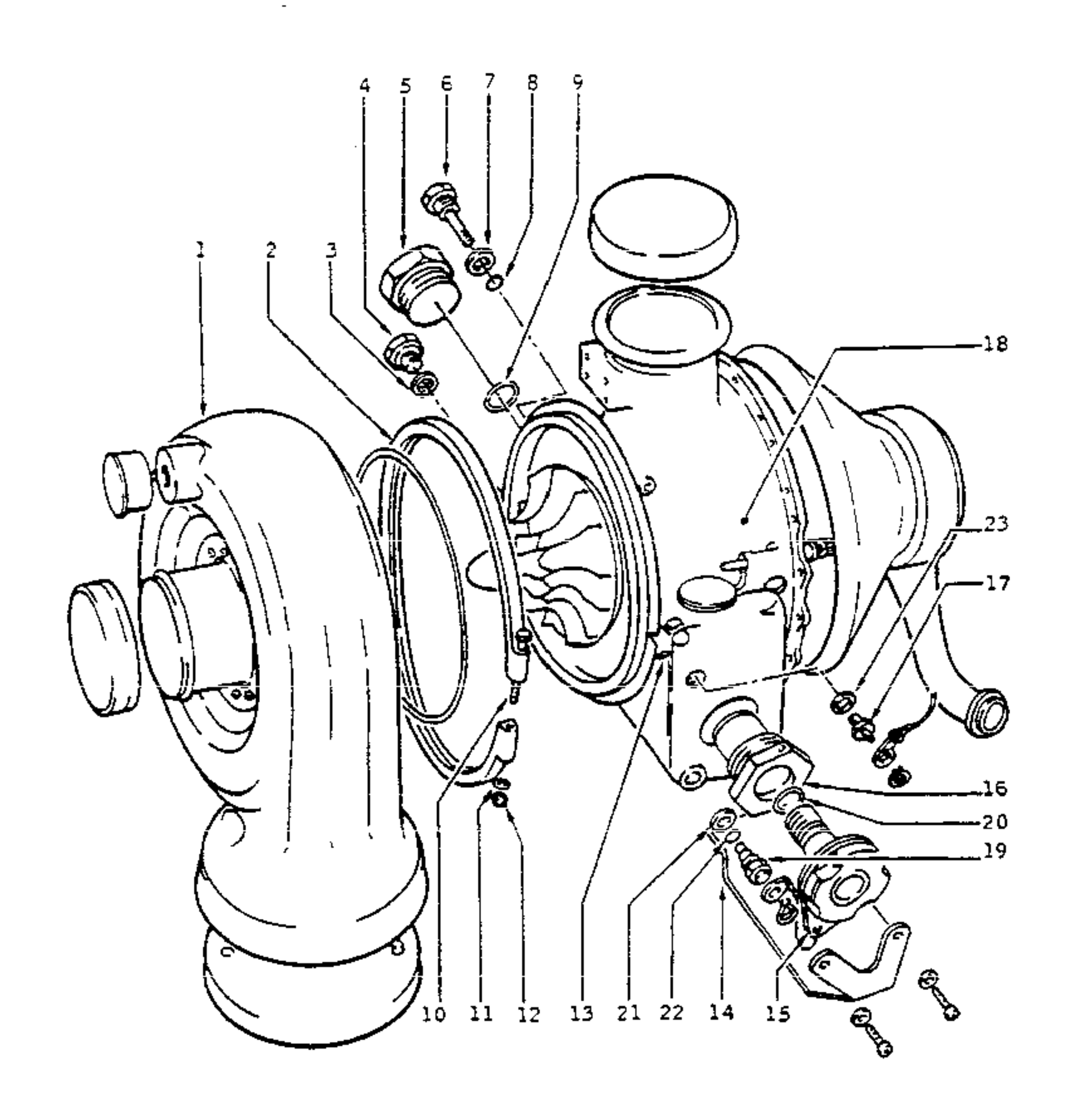
RB (24) Check cold air unit outlet ducts on aircraft for
RB traces of oil.

RB (a) If oil deposits are present, clean in accordance
RB with 05-52-11, para. 2.D.

RB (b) If the engine has not been removed, request an
RB engine run-up in order to burn the deposited
RB oil in accordance with 05-52-11, para. 2.D.

D. Preparation of Replacement Component (Ref. Fig. 401)

NOTE: Install a CAU corresponding to the removed one. It is possible to convert group 1 or 3 CAU to install it on group 2 or 4 and vice versa.



CMA 21 12 35 4 ABMO

Handing of CAU
Figure 401

R

(1) Handing of group 1 CAU to install it on group 2.

(a) Reposition impeller casing (1).

(a1) Remove nuts (11), special washers (12) and bolts (10) from both half-clamps (2).

(a2) Remove locating spigot (13).

(a3) Swing impeller casing (1) through 18° to align it with the other locating slot. Install locating spigot (13).

(a4) Install both half-clamps (2).

(a5) Install bolts (10), washers (12) so that chamfers match in the clamps.

(a6) Screw nuts (11) and check that clamp faces do not come into contact. Tighten nut (11). Torque to between 20 and 24 lbf in (0.224 and 0.271 mdaN).

(b) Change location of lubrication system.

(b1) Remove blanking plug (5) sealing ring (9). Remove blanking plug (6) sealing washer (7) and ring (8). Remove both blanking plugs (4) and sealing washers (3).

(b2) Remove filter cap (15) and seal (20). Remove identification plate (14). Remove sealing plugs (19) sealing washers (21), seals (22). Remove plug (17) and sealing washer (23), do not detach the cable retaining plug (17). Remove oil filter adaptor (16).

NOTE: Sealing rings, O-rings are discarded and replaced by new ones at installation.

Interchange items removed in (b1) with items removed in (b2) and assemble in new position.

CAUTION: FILLER CAP (15) IS ONLY TIGHTENED BY HAND. USE OF SPECIAL WRENCH IS PROHIBITED.

Torque to the following values:

Item (4) 50 lbf in (0.565 mdaN)
Item (5) 300 lbf in (3.389 mdaN)
Item (6) 250 lbf in (2.824 mdaN)
Item (16) 250 lbf in to 300 lbf in (2.824 to 3.389 mdaN)
Item (17) 250 lbf in (2.824 mdaN)
Item (19) 50 lbf in (0.565 mdaN)

CAUTION: THE OPERATIONS DESCRIBED BELOW MUST BE FOLLOWED EXACTLY.

B (2) Using a syringe replenish with 50ml of oil (Ref.
B 12-13-21).

(3) Place cold air unit on a bench with compressor inlet facing downwards.
Leave it in this position for two minutes and rotate at least five times the compressor-turbine assembly.

(4) Carry out the same operation with cold air unit resting on turbine outlet.

NOTE: If a CAU malfunction or oil leak causes the SMOKE warning light to come on, it is necessary to refer to 05-52-11, Cleaning/ Painting.

E. Install (Ref. Fig. 402 and 403)

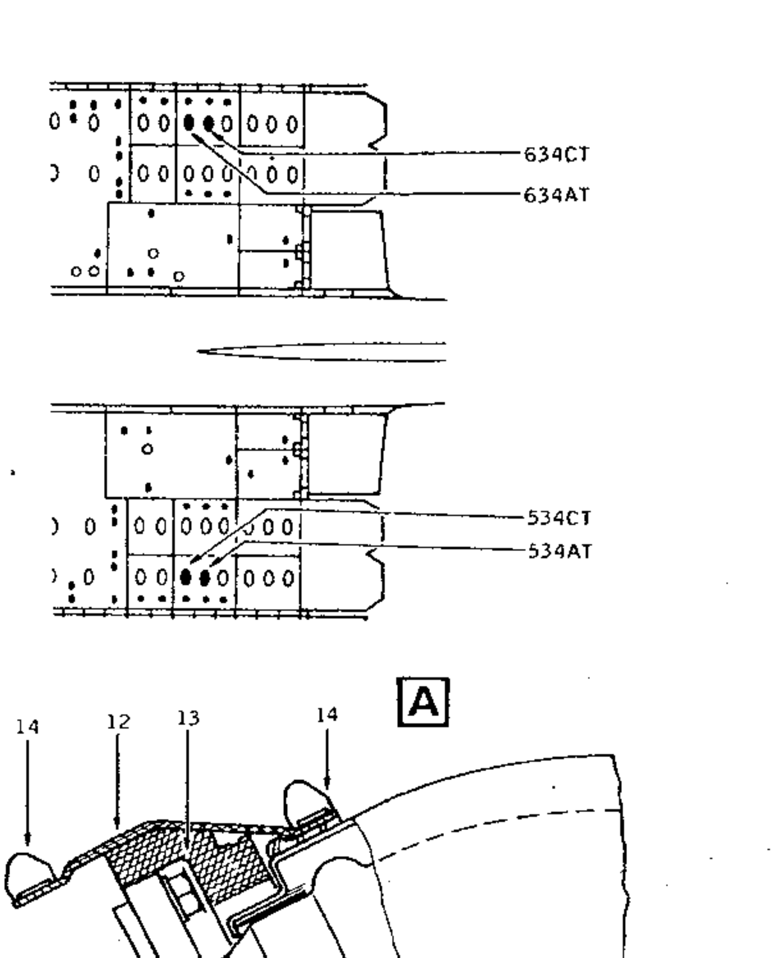
(1) Engage CAU (12) on turbine outlet duct.

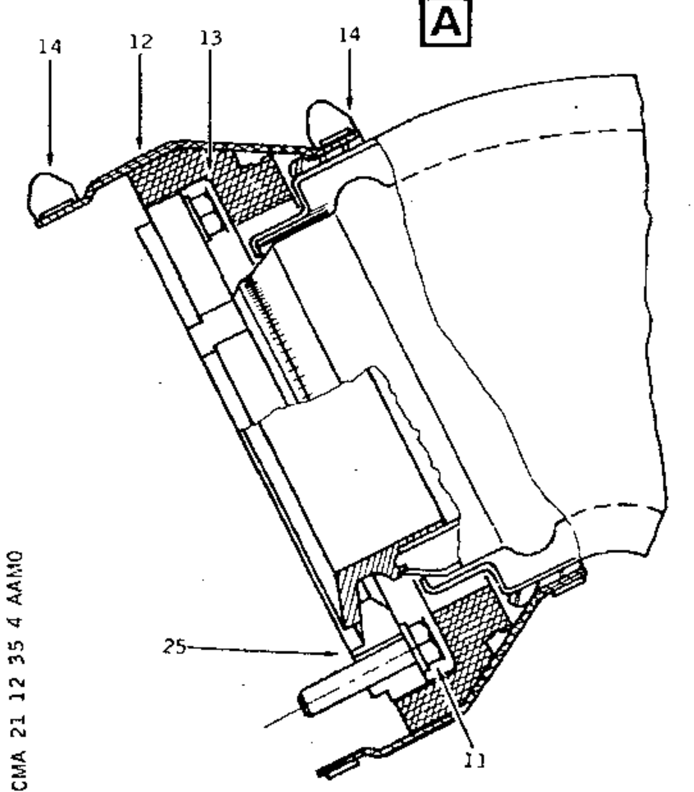
NOTE 1: (Ref. Fig. 404)
For groups 1 and 4, insert adjusting shim Part No. E920692-100 between CAU and Rib 15A.

NOTE 2: (Ref. Fig. 405)
For all groups, using Part No. E920692-200, check that CAU is correctly positioned on turbine outlet duct.

(2) Install a new seal (25).

(3) Install screws (11). Torque to between 0.20 and 0.35

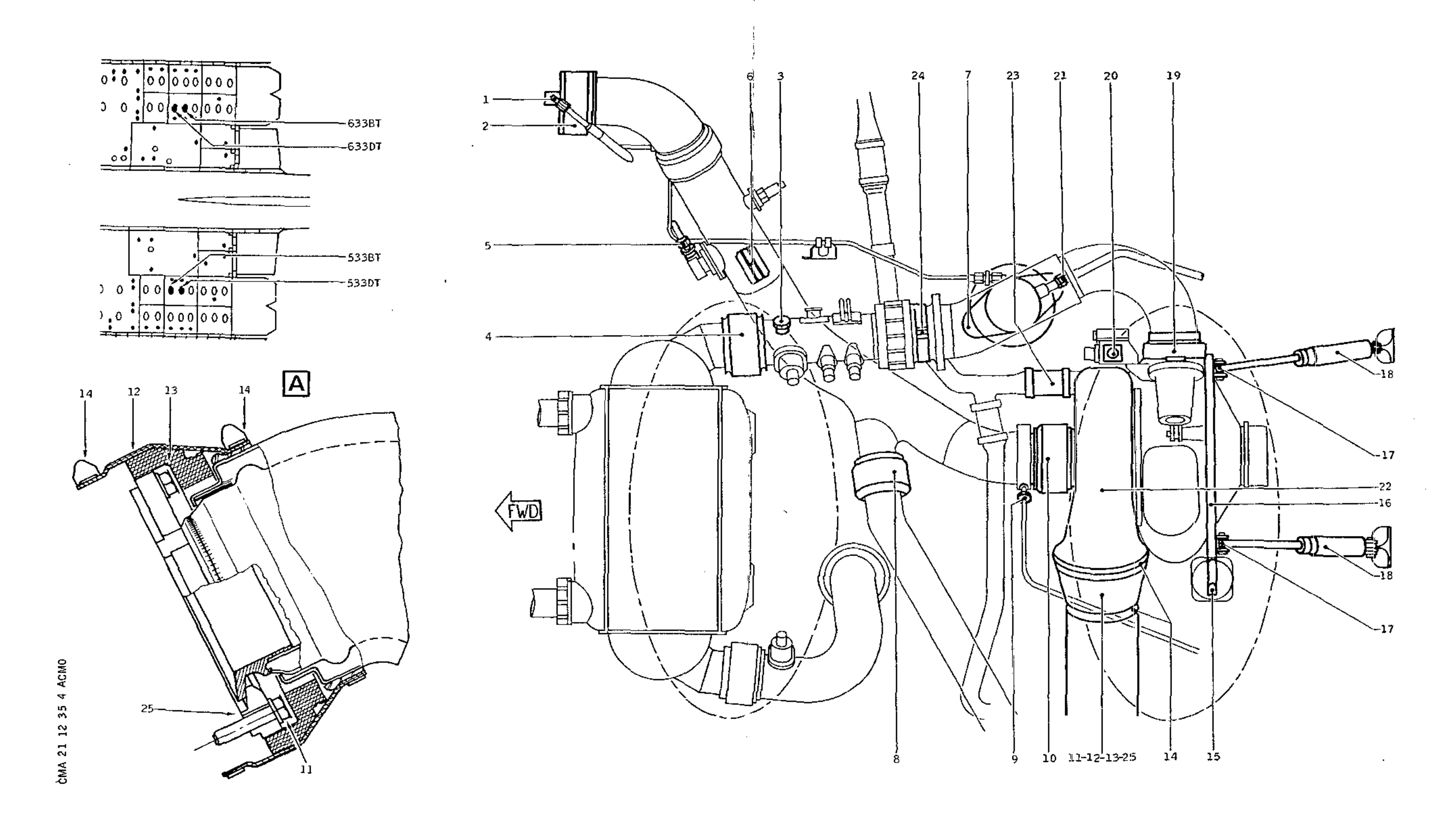




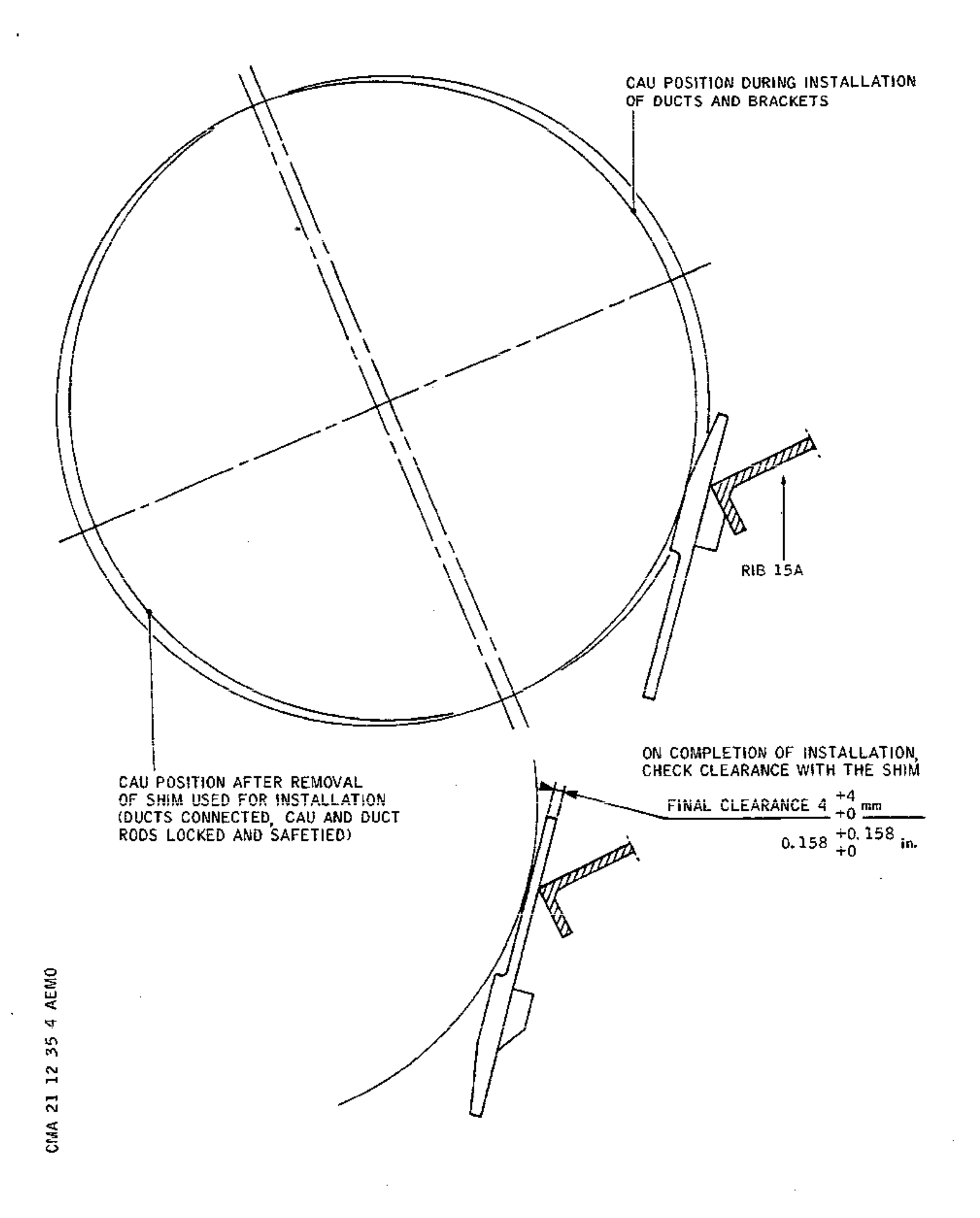
CMA 21 12 35 4 AAM0

R

Cold Air Unit - Groups 1 and 4
Figure 402

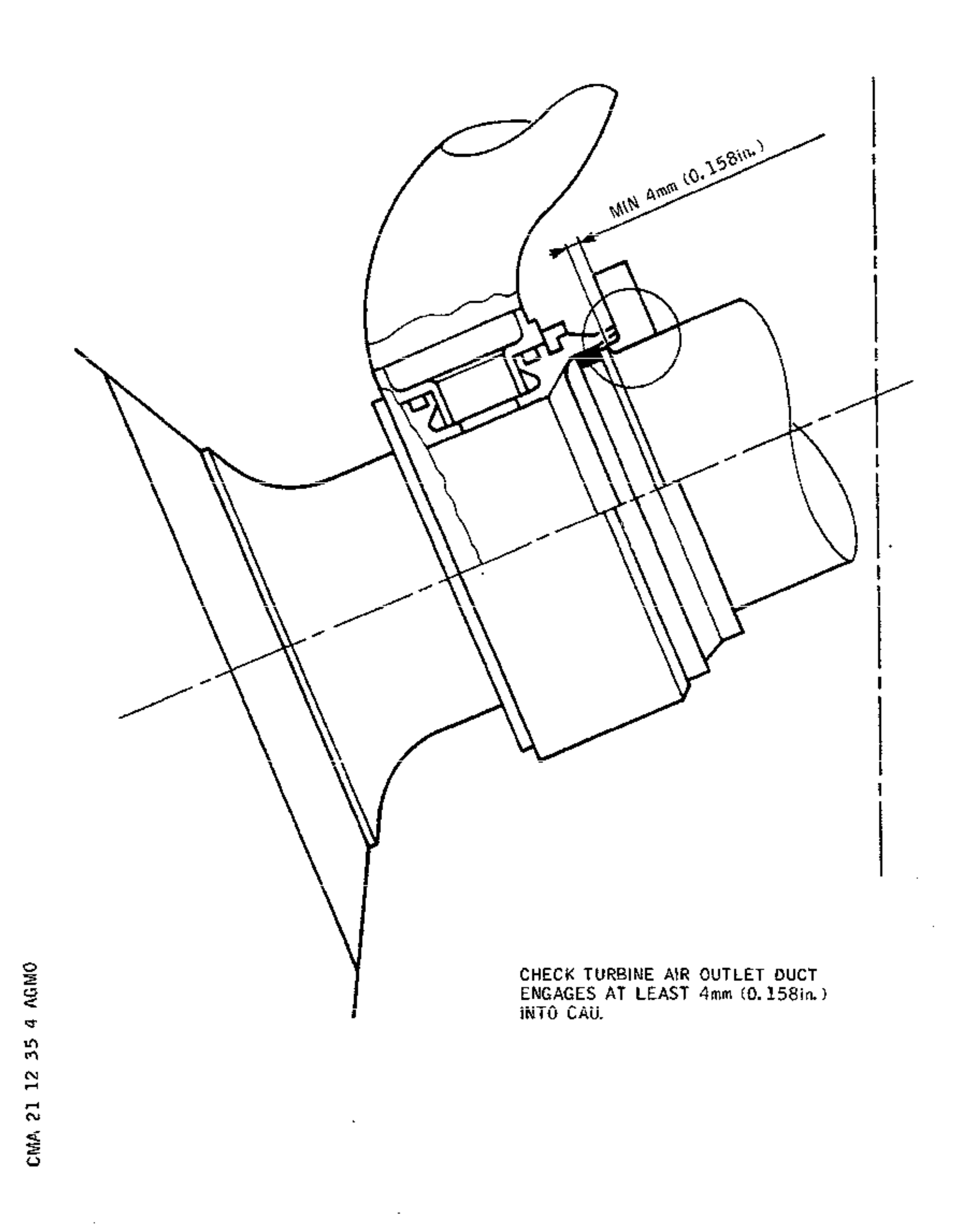


Cold Air Unit - Groups 2 and 3
Figure 403



Installation of shim on groups 1 and 4
Figure 404

R



Check of CAU position on Turbine
Outlet Duct
Figure 405

R

m.daN (18 and 31 lbf. in.).

(4) Install heat insulating half rings (13). Wirelock.

(5) Push back sleeve (12). Install clamps (14).

(6) Screw union (23) ; install heat insulating half rings, sleeve and clamps.

(7) Install rods (18) and bolts (17).

(8) Install bonding strip (16).

(9) Install screw (15) and wirelock.

(10) Install compressor inlet duct.

(11) Install clamps (10) and (8).

(12) Install swivel joint (2) and wirelock.

(13) Install link rod (6).

(14) Screw unions (1) and (5).

(15) Install duct (7).

(16) Install clamps (4) and (19) (move swivel joint if necessary).

(17) Screw unions (3) and (21).

(18) Install link rod (24).

R (19) On groups 1 and 4, Remove shim E920692100. Check final clearance between CAU and RIB15A using the thinner end of shim E92069100

CAUTION : TOP UP COLD AIR UNIT (Ref. 12-13-21).

F. Test

(1) Carry out test procedure described in 21-12-35, Adjustment/Test.

(2) After test, check oil level in CAU top-up if necessary (Ref. 12-13-21).

G. Close-Up

(1) Remove safety clips and tags and reset the circuit

breaker tripped in paragraph 2. B. (3).

(2) Close access doors.

COLD AIR UNIT - ADJUSTMENT/TEST

1. General

The purpose of this test is to check cold Air Unit for evidence of leakage and security of attachment after a Removal/Installation operation.

2. Operational Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Ground Air Supply Unit : - Relative Minimum Pressure 2 bars Airflow : 0.4 kg/sec. - Relative Maximum Pressure : 4.5 Bars Airflow 0.6 kg/sec. - Temperature Must Not Exceed 300°C	
Circuit Breaker Safety Clips	

B. Prepare

(1) Connect electrical ground power unit (Ref. 24-41-00, S).

(2) Connect ground air supply unit.

R (3) Pressurize Fuel System

R WARNING : OBSERVE FUEL SYSTEM SAFETY PRECAUTIONS
R DESCRIBED IN 28-00-00 AND 28-10-00.

R NOTE : Pressurization assumes a minimum quantity of
R fuel of 2500 kg in the appropriate feed tank (1,
R 2, 3, 4).
R On centre console, place throttle control levers
R in SHUT position (lower mechanical stop).
R Check that crossfeed valves are closed and that
R associated magnetic indicators display vertical
R stripes.
R With the LP VALVE switch locked at OPEN by the
R switch guard, check that the associated magnetic
R indicator shows an in-line indication.

Place the first of the three ENGINE FEED PUMPS control switches in ON position (MAIN PUMP)
Engine 1 Main Fuel Pump for group 1
Engine 2 Main Fuel Pump for group 2
Engine 3 Main Fuel Pump for group 3
Engine 4 Main Fuel Pump for group 4
Check that corresponding LOW PRESS indicator light goes off when pump operating pressure is reached.

WARNING : FUEL SYSTEM MUST NOT OPERATE MORE THAN 2 HOURS.

In case Fuel System cannot be used.

Trip, safety and tag the following circuit breakers

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
For GRP 1 LH.UC WEIGHT SW A SYS SUP	1-213	G 292	M17
For GRP 2 LH.UC WEIGHT SW B SYS SUP	3-213	G 293	B 8
For GRP 3 RH.UC WEIGHT SW B SYS SUP	3-213	G 294	B 9
For GRP 4 RH.UC WEIGHT SW A SYS SUP	1-213	G 295	M18

WARNING : DURING TEST, FUEL EXCH WARNING LIGHT MAY ILLUMINATE. ON PANEL 2-214 PLACE FUEL VALVE SWITCH IN OPEN POSITION (SELF-HOLDING CANCELLATION).

(4) WARNING : CHECK THAT OIL LEVEL IS CORRECT IN COLD AIR UNIT.

C. Test

(1) Start ground air supply unit.

(2) On AIR BLEED CONTROL panel 2-214, place CROSS BLEED switch of group to be tested in OPEN position.

(3) On AIR BLEED CONTROL panel 2-214, place COND VALVE switch in ON position.

(4) Check for evidence of leakage at level of cold air unit attachment clamps and of duct attachment clamps which have been removed on removal of cold air unit.

(5) On AIR BLEED CONTROL panel 2-214, place COND VALVE switch in BOOST position.

R
R (6) The cold air unit control actuator must operate.

R (7) Place COND VALVE switch in ON position then in OFF
R position.

R (8) The cold air unit control actuator must return to its
R initial position.

(9) Place CROSS BLEED switch in SHUT position.

(10) Shut down ground air supply unit.

D. Close-Up

R (1) In case the Fuel system has been pressurized.

R Place ENGINE FEED PUMP switch in OFF position.
R After a few seconds the corresponding LOW PRESS indi-
R cator light must illuminate.

R If necessary, remove safety clip and tag and reset
R circuit breaker tripped in paragraph 2.B.(3).
R If FUEL EXCH warning has come on during test after
R switching off the ground air supply unit, wait for
R cancellation of warning and place FUEL VALVE switch
R in AUTO position.

(2) Disconnect ground air supply unit.

(3) De-energize the aircraft electrical network and disconnect electrical ground power unit.

3. Functional Test

The purpose of this test is to check that the cold air unit inlet nozzle area varies while actuated by the cold air unit absolute pressure switch 1 (2, 3, 4) H884.

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
RB 2 Pressure Gauges 0 to 5 bars (0-70 PSI)	
2 dry air or nitrogen supply Units capable of supplying a pressure greater than or equal to 4 bars	
2 Air Vent Valves	
Coupling Adaptor - Testing, Air Conditioning	0921602000

B. Prepare (Ref. Fig. 501)

(1) Gain access to cold air unit absolute pressure switch by opening the relevant door

RB - 415A L for group 1 pressure switch 1H884
RB - 426A R for group 2 pressure switch 2H884
RB - 435A L for group 3 pressure switch 3H884
RB - 446A R for group 4 pressure switch 4H884

(2) Remove union from "in situ" connector of cold air unit absolute pressure switch (1H884/4H884) and connect test equipment according to the figure.

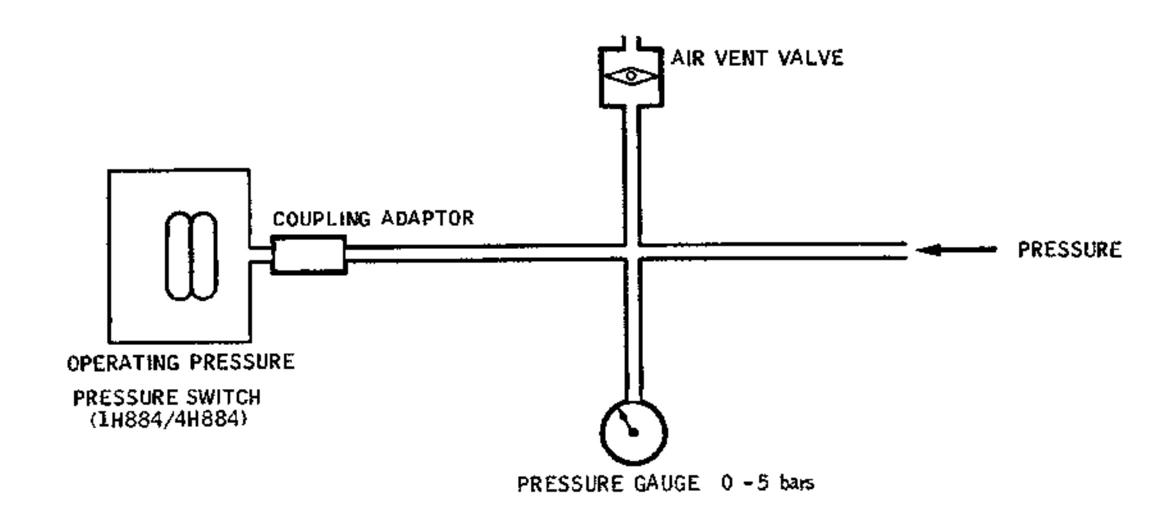
WARNING : MAKE CERTAIN THAT THE TEST EQUIPMENT IS FURNISHED WITH A SAFETY SYSTEM ENABLING THE ABSORPTION OF ANY POSSIBLE OVERPRESSURE WHICH MIGHT DAMAGE THE PRESSURE SWITCH.

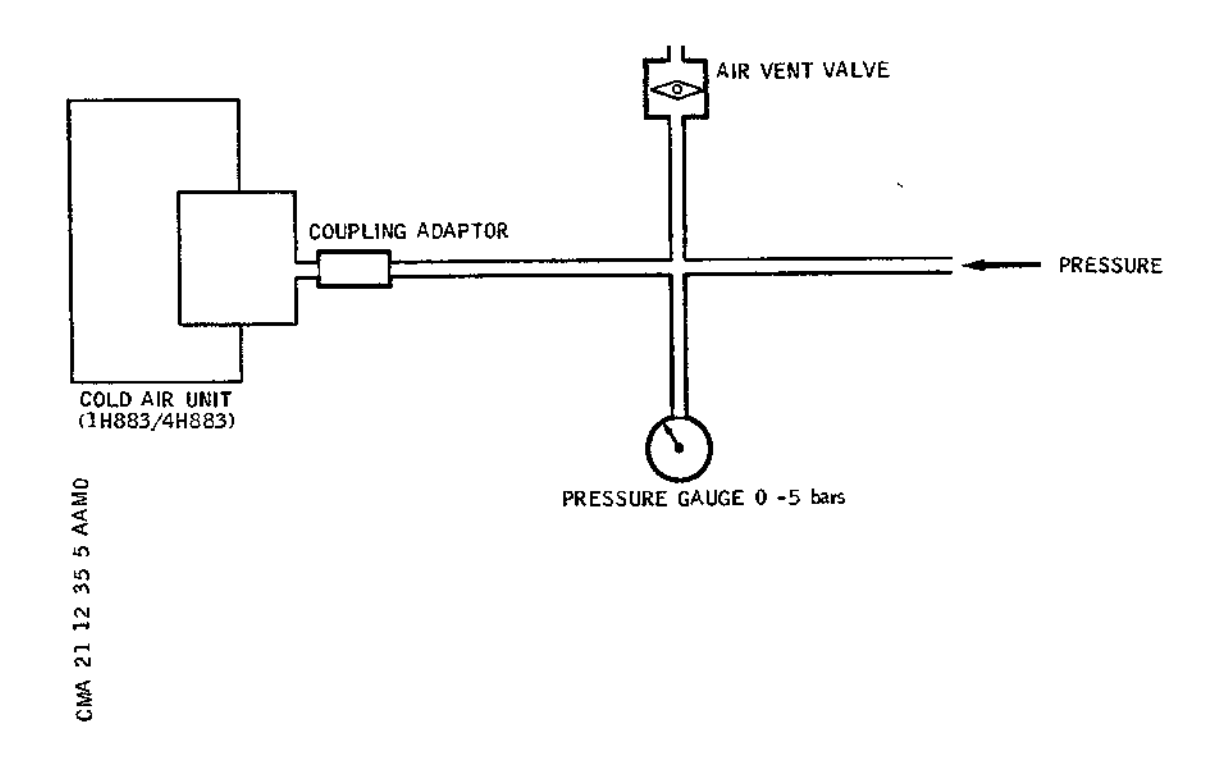
(3) Gain access to cold air unit by opening the relevant door.

- 534CT for group 1 cold air unit 1H883
- 533DT for group 2 cold air unit 2H883
- 633DT for group 3 cold air unit 3H883
- 634CT for group 4 cold air unit 4H883

(4) Remove "in situ" connector union and connect test equipment according to the figure.

WARNING : MAKE CERTAIN THAT THE TEST EQUIPMENT IS FURNISHED WITH A SAFETY SYSTEM ENABLING THE ABSORPTION OF ANY POSSIBLE OVERPRESSURE





CMA 21 12 35 5 AAM0

Test Equipment
Figure 501

WHICH MIGHT DAMAGE THE ACTUATOR CONTROLLER ASSEMBLY.

(5) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(6) Make certain that the following circuit breakers are set:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1 GRP1 AIR GEN CONT & IND	1-213	1H 862	D13
Group 2 GRP2 AIR GEN CONT & IND	5-213	2H 862	F 9
Group 3 GRP3 AIR GEN CONT & IND	15-215	3H 862	B 3
Group 4 GRP4 AIR GEN CONT & IND	15-216	4H 862	B23

(7) Trip the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
For Groups 1 and 2 LH UC WEIGHT SW "B" SYS SUP	3-213	G 293	B 8
For Groups 3 and 4 RH UC WEIGHT SW "A" SYS SUP	1-213	G 295	M18

C. Test

(1) Using test equipment, apply a relative pressure greater
RB than or equal to 1.5 bar (21.8 psi) to the actuator controller assembly.

WARNING: RELATIVE PRESSURE MUST NOT EXCEED 4.5 BAR (65.3 PSI)

RB (2) Apply a pressure of 2.8 ± 0.07 bar (40.6 ± 1.0 psi)
RB absolute pressure (1.79 ± 0.07 bar (26.0 ± 1.0 psi)
RB gauge pressure) to pressure switch.

(3) Check that actuator controller remains engaged on the large nozzle area position.

(4) Increase pressure applied to pressure switch and check that actuator controller causes the small nozzle area to be engaged (actuator extends) for an absolute
RB pressure value of 3.35 ± 0.07 bar (48.58 ± 1.0 psi)
RB (gauge pressure 2.34 ± 0.07 bar (34.0 ± 1.0 psi).

WARNING: RELATIVE PRESSURE MUST NOT EXCEED 4.5 BAR
RB (65.3 PSI).

(5) Decrease pressure at pressure switch. The actuator controller returns to its initial position for a
RB pressure value of 2.8 ± 0.07 bar (40.6 ± 1.0 psi)
RB (gauge pressure 1.79 ± 0.07 bar (26.0 ± 1.0 psi)).

D. Close-Up

(1) Slowly decrease pressure applied to pressure switch down to zero. Disconnect test equipment and blank off "in-situ" connector.

(2) Slowly decrease pressure applied to actuator controller down to zero and blank off "in-situ" connector.

(3) De-energize the aircraft electrical network and disconnect electrical ground power unit.

(4) Reset circuit breakers.

B (5) Disconnect pressure switch sensor pipe at duct end.

B (6) Apply 30 psig pressure from shop air line.

B (7) Check pipe run for leaks using leak detector fluid.

B (8) Remake leaking joints, change leaking pipes.

B (9) Shut off and remove air supply. Reconnect pipe.

B (10) Close access doors.

(3) Check that actuator controller remains engaged on the large nozzle area position.

(4) Increase pressure applied to pressure switch and check that actuator controller causes the small nozzle area to be engaged (actuator extends) for an absolute
B pressure value of 3.35 ± 0.07 bars (Gauge pressure
B 34 ± 1 P.S.I.).

WARNING: RELATIVE PRESSURE MUST NOT EXCEED 4.5 BARS.

(5) Decrease pressure at pressure switch. The actuator controller returns to its initial position for a pressure
B value of 2.8 ± 0.07 bars (Gauge pressure 26 ± 1 P.S.I.)

D. Close-Up

(1) Slowly decrease pressure applied to pressure switch down to zero. Disconnect test equipment and blank off "in-situ" connector.

(2) Slowly decrease pressure applied to actuator controller down to zero and blank off "in situ" connector.

(3) De-energize the aircraft electrical network and disconnect electrical ground power unit.

(4) Reset circuit breakers.

RB (5) Disconnect pressure switch sensor pipe at duct end.

RB (6) Apply 30 psig pressure from shop air line.

RB (7) Check pipe run for leaks using leak detector fluid.

RB (8) Remake leaking joints, change leaking pipes.

RB (9) Shut off and remove air supply. Reconnect pipe.

RB (10) Close access doors.

COLD AIR UNIT - INSPECTION/CHECK

1. General

Check of level and oil consumption.

2. Cold Air Unit

A. Prepare

(1) Open access doors

534CT for cold air unit 1
533DT for cold air unit 2
633DT for cold air unit 3
634CT for cold air unit 4

B. Check

R (1) Check oil level in level indicator eye glass.
R (A mark painted on cold air unit indicates oil level).

R (2) Top up if oil level is not correct. (Ref. 12-13-21,
R Page Block 1).

COLD AIR UNIT LEAK DETECTOR REMOVAL/INSTALLATION

1. General

The removal/installation procedure is identical for the cold air unit leak detectors of each air conditioning group. There are two detectors to each group;

2. Cold Air Unit Leak Detectors

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform	
Circuit Breaker Safety Clip	

B. Prepare

(1) Trip safety and tag one of the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1 GRP 1 AIR COND VALVE CLOSE & AIR GEN IND	1-213	1H 612	D11
Group 2 GRP 2 AIR COND VALVE CLOSE & AIR GEN IND	5-213	2H 612	A 9
Group 3 GRP 3 AIR COND VALVE CLOSE & AIR GEN IND	15-215	3H 612	A 3
Group 4 GRP 4 AIR COND VALVE CLOSE & AIR GEN IND	15-216	4H 612	A24

(2) Open one of the following access doors :

534ET for the removal/installation of group 1 leak detector

533FT for the removal/installation of group 2 leak detector
633FT for the removal/installation of group 3 leak detector
634ET for the removal.installation of group 4 leak detector

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector.

(2) Disconnect union (4).

(3) Loosen screws (6).

(4) Disconnect tee union (5) discard seal (7) retain washer (8).

(5) Remove screws (3) and retain washers.

(6) Remove leak detector (2).

D. Install

(1) Install leak detector (2) by means of screws (3) fitted with washers.

(2) Tighten tee union (5) fitted with seal (7) and washer (8).

(3) Tighten union (4).

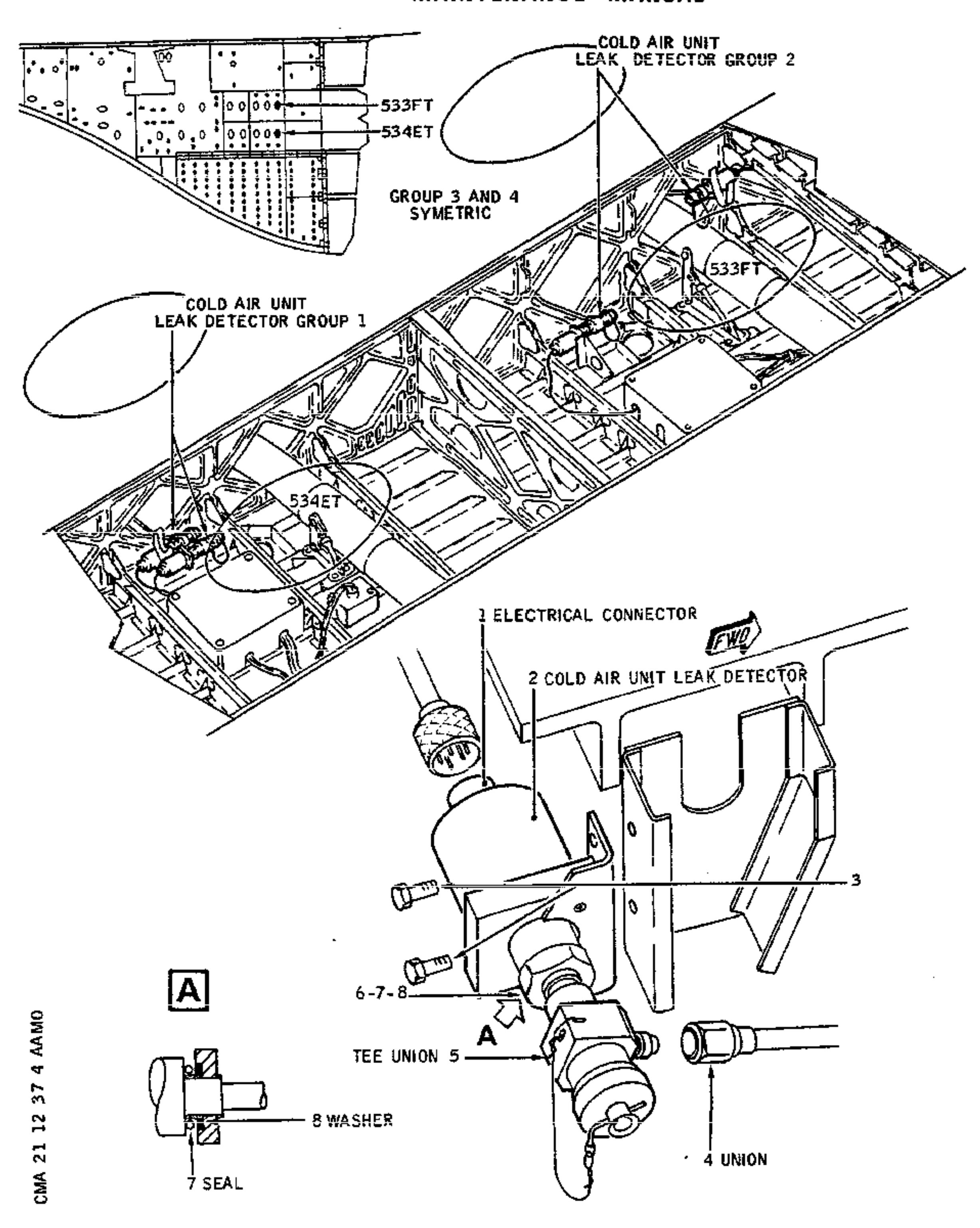
(4) Tighten screw (6).

(5) Connect electrical connector (1)

E. Close-Up

(1) Close the access door previously opened in paragraph 2.B.(2).

(2) Remove safety clip and tag and reset the circuit breaker tripped in paragraph 2.B.(1).



Cold Air Unit Leak Detector
Figure 401

COLD AIR UNIT LEAK DETECTOR - ADJUSTMENT/TEST

1. General

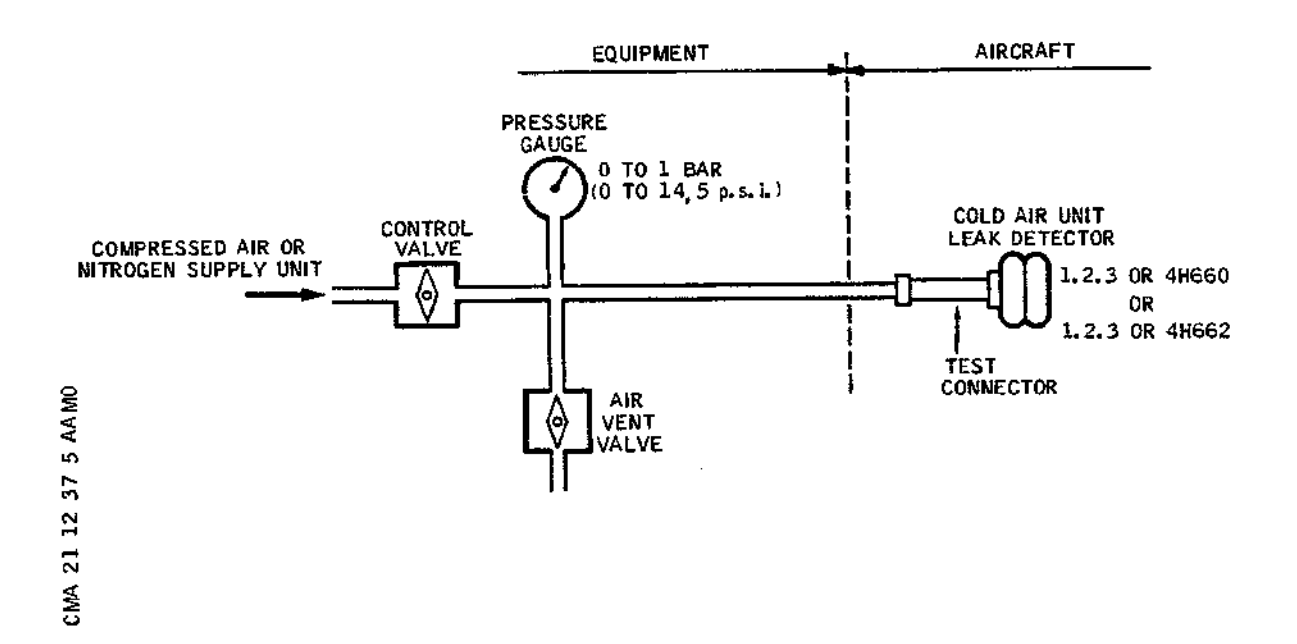
The test procedure is identical for the cold air unit leak detectors of all groups.

The cold air unit leak detectors are checked for evidence of leakage at each air evacuation static port ; the test is identical for static ports of all groups.

2. Functional Test

A. Equipment and Materials (Ref. Fig. 501)

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Supply Unit - Dry Compressed Air (or Nitrogen), static pressure : 1 bar (or 14 psi) 1 pressure reducing valve 0 - 1 bar	
R Coupling Adaptors - Testing, Air Conditioning System Components	D921602100
R Test equipment arranged according to Figure below	
Two Ground Service Telephones	



Test Equipment
Figure 501

B. Prepare

(1) Remove the appropriate door in order to gain access to leak detector to be checked.

534ET	for Group 1
533ET	for Group 2
633ET	for Group 3
634ET	for Group 4

(2) On first leak detector 1, 2, 3 or 4H660 unscrew and remove blanking cap from test connector.

R (3) Install coupling adaptor D921602100 and connect test equipment according to the figure (Ref. Fig. 501)

(4) According to the group on which leak detectors are checked, check that the relevant circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
For Group 1 GRP 1 AIR COND VALVE CLOSE & AIR GEN IND	1-213	1H 612	D11
For Group 2 GRP 2 AIR COND VALVE CLOSE & AIR GEN IND	5-213	2H 612	A 9
For Group 3 GRP 3 AIR COND VALVE CLOSE & AIR GEN IND	15-215	3H 612	A 3
For Group 4 GRP 4 AIR COND VALVE CLOSE & AIR GEN IND	15-216	4H 612	A24

C. Test

(1) Apply a gradually increasing pressure to leak detector.
When pressure indicated by test pressure gage reaches 9 ± 0.5 psi (or 0.63 ± 0.035 bar), LEAK indicator light associated to the corresponding group (1, 2, 3 or 4) must illuminate on TEMPERATURE CONTROL panel 2-214 on flight engineer's panel.

(2) Decrease pressure to zero

Functional test for the second leak detector 1, 2, 3 or 4H662 is identical to test of the first one belonging to the same group.

D. Close-Up

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

R (2) Remove test equipment and coupling adaptor D921602100.

(3) Install blanking cap on test connector of leak detector.

(4) Install access doors.

(5) Disconnect ground service telephones.

3. Test of Leak Detector for Evidence of Leakage

A. Equipment and Materials

DESCRIPTION	PART NO.
Supply Unit - Dry Compressed Air (Or Nitrogen), pressure : 0.5 bar (or 7.25 psi)	
R Adapter - Temperature Limiting	D921626000
R Test Equipment arranged according to the figure	

B. Prepare (Ref. Fig. 502)

(1) Open the relevant cowls in order to gain access to air evacuation static ports corresponding to group to be tested.
Cowls 651EB and 651DB for group 2
Cowls 561EB and 561DB for group 3

R NOTE : Static ports of groups 1 and 4 are not located under a cowl.

R (2) Install adapter 921626000 on static port and connect
R the equipment arranged according to the figure (Ref. Fig. 501)

C. Test

R (1) Pressurize to 0.5 bar (or 7.25 psi) by means of test equipment.

WARNING : DO NOT EXCEED THIS PRESSURE VALUE.

Shut down air (or nitrogen) supply unit.

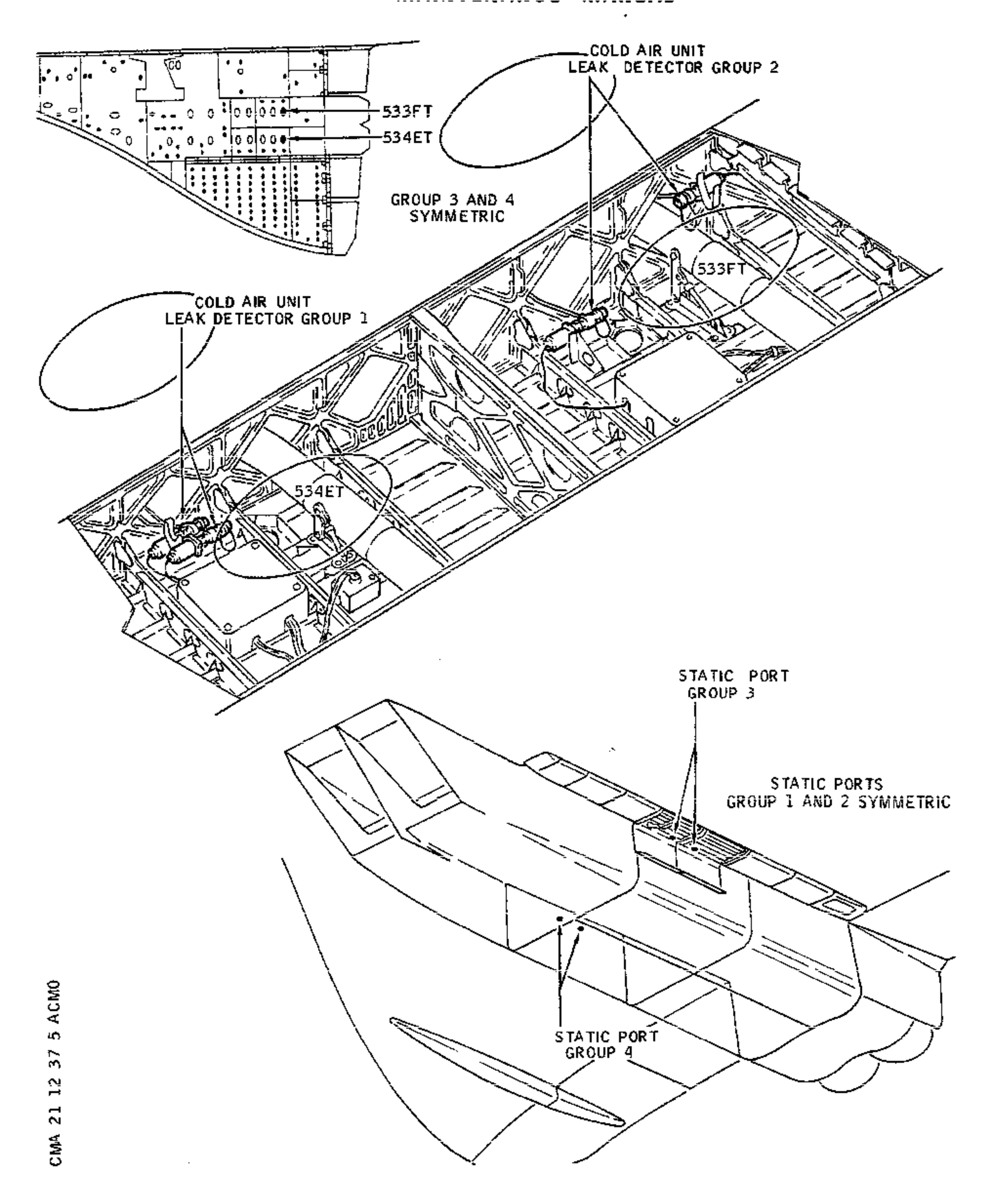
R Depressurization must not exceed the rate of 100 mb/mn (or 1.45 psi/mn).

(2) Return pressure to zero.

D. Close-Up

R (1) Remove adapter 921626000.

(2) Close cowls (for groups 2 and 3).



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Location of Static Ports
Figure 502

B AIR CONDITIONING OVERHEAT DETECTOR (DUCT 2)
B REMOVAL/INSTALLATION

1. General

The removal/installation procedure of overheat detectors 1 (2,3,4) H658 is identical for each group.

2. Overheat Detector

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Access Platform	

B. Prepare

(1) Open access doors

535 AT for group 1 overheat detector
542 AB for group 2 overheat detector
642 AB for group 3 overheat detector
635 AT for group 4 overheat detector

(2) Trip safety and tag the following circuit breakers.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1			
GR1 FUEL VALVE CONT	2-213	1H 863	D16
AIR COND VALVE CLOSE AND AIR GEN IND	1-213	1H 612	D11
Group 2			
GR2 FUEL VALVE CONT	4-213	2H 863	E12
AIR/COND VALVE & AIR GEND IND	5-213	2H 612	A 9
Group 3			
GR3 FUEL VALVE CONT	2-213	3H 863	F16

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
AIR/COND VALVE & AIR GEN IND	15-215	3H 812	A 3
Group 4			
GR4 FUEL VALVE CONT	4-213	4H 863	B11
AIR/COND VALVE & AIR GEN IND	15-216	4H 612	A24

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1)

(2) Remove screws (2)

(3) Remove overheat detector (3)

D. Install

(1) Install overheat detector (3)

(2) Install screws (2)

(3) Connect electrical connector (1)

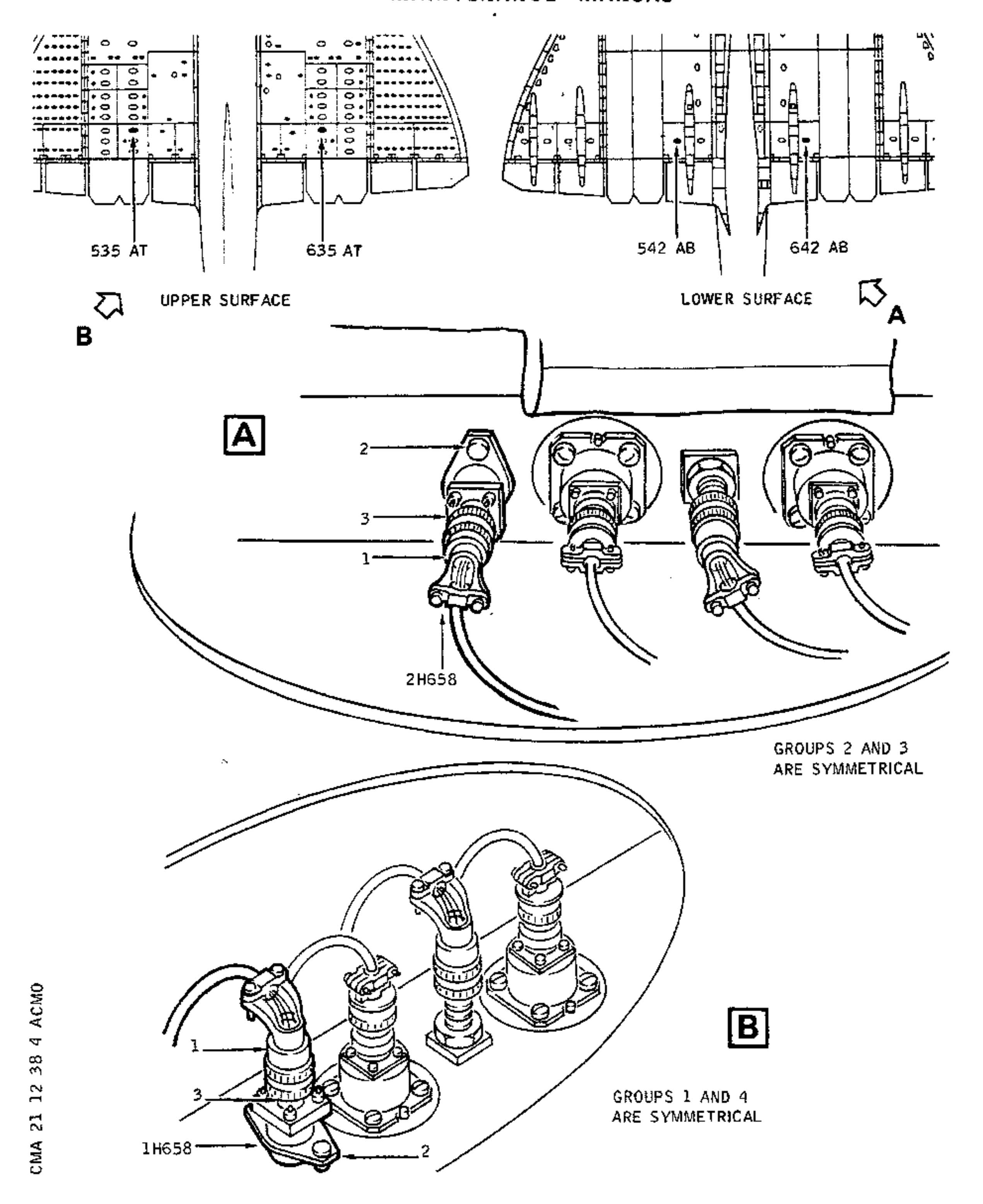
E. Close Up

(1) Close access doors

(2) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2 B (2).

F. Test

Carry out the test procedure described in 21-10-00, Adjustment/Test, paragraphs 2A-2B-3B (1) (2) (3) (4) 3F-3H.



R

Overheat Detector
Figure 401

B FUEL HEAT EXCHANGER OVERHEAT DETECTOR (DUCT 1)
B REMOVAL/INSTALLATION

1. General

The removal/installation procedure of overheat detectors is identical for each group.

2. Overheat Detector

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit breaker safety clips	
Access platform	

B. Prepare

(1) Open access door :

534 AT for group 1 overheat detector
533 BT for group 2 overheat detector
633 BT for group 3 overheat detector
634 AT for group 4 overheat detector

(2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1			
GR1 FUEL VALVE CONT	2-213	1H 863	D16
GR1 TEMP SELECTOR AUTO SUP AND CONT		H1000	B17
Group 2			
GR2 FUEL VALVE CONT	4-213	2H 863	E12
GR2 TEMP SELECTOR AUTO SUP AND CONT		H1001	E11
Group 3			
GR3 FUEL VALVE CONT	2-213	3H 863	F16
GR3 TEMP SELECTOR AUTO SUP AND CONT		H1002	G16

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 4			
GR4 FUEL VALVE CONT	4-213	4H 863	B11
GR4 TEMP SELECTOR AUTO SUP AND CONT		H1003	B12

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1)

(2) Remove screws (2)

(3) Remove overheat detector (3)

D. Install

(1) Install overheat detector (3)

(2) Install screws (2)

(3) Connect electrical connector (1)

E. Close Up

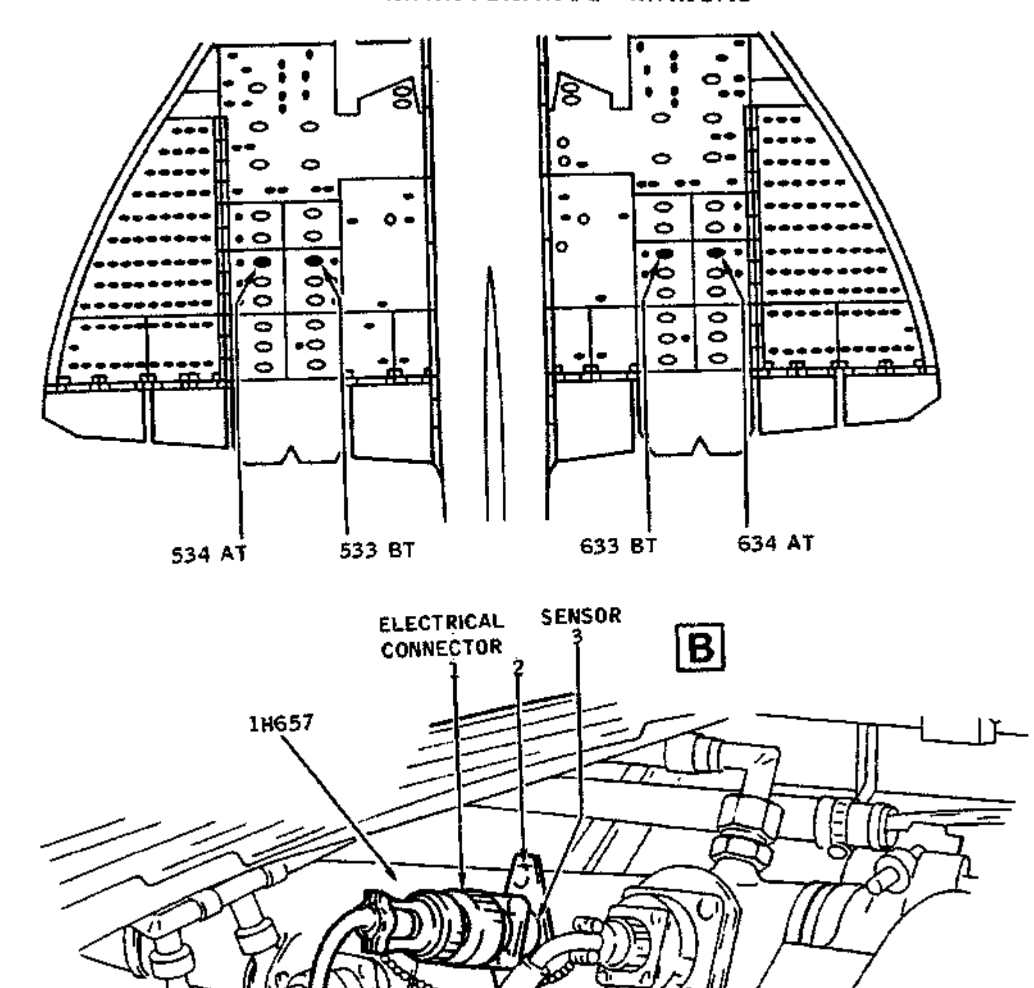
(1) Close access doors

(2) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2 B (2).

F. Test

Carry out the test procedure described in 21-10-00, Adjustment/Test, paragraphs 2A - 2B - 3B (1) (2) (3) (4) - 3E - 3F (4) (5) (6) - 3H.

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Fuel Heat Exchanger Overheat Detector
R Figure 401

B OVERHEAT THERMOSWITCH (CABIN ISOL'N)
B REMOVAL/INSTALLATION

1. General

The removal, installation procedure of overheat thermoswitches is identical for each group.

2. Overheat Detector

A. Equipment and Materials

DESCRIPTION	PART NO.
Access platform 3.82 m (10 ft. 9 in.)	
Circuit breaker safety clip	

B. Prepare

(1) Open access door :

541 AB for group 1 overheat thermoswitch
541 AB for group 2 overheat thermoswitch
641 AB for group 3 overheat thermoswitch
641 AB for group 4 overheat thermoswitch

(2) Trip safety and tag one of the following circuit breakers

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1 AIR COND VALVE CLOSE AND AIR GEN IND	1-213	1H 612	D11
Group 2 AIR/COND VALVE AND AIR GEN IND	5-213	2H 612	A 9
Group 3 AIR/COND VALVE AND AIR GEN IND	15-213	3H 612	A 3
Group 4 AIR/COND VALVE AND AIR	15-216	4H612	A24

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GEN IND			

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1)

(2) Remove screws (2)

(3) Remove overheat thermoswitch (3)

D. Install

(1) Install overheat thermoswitch (3)

(2) Install screws (2)

(3) Connect electrical connector (1)

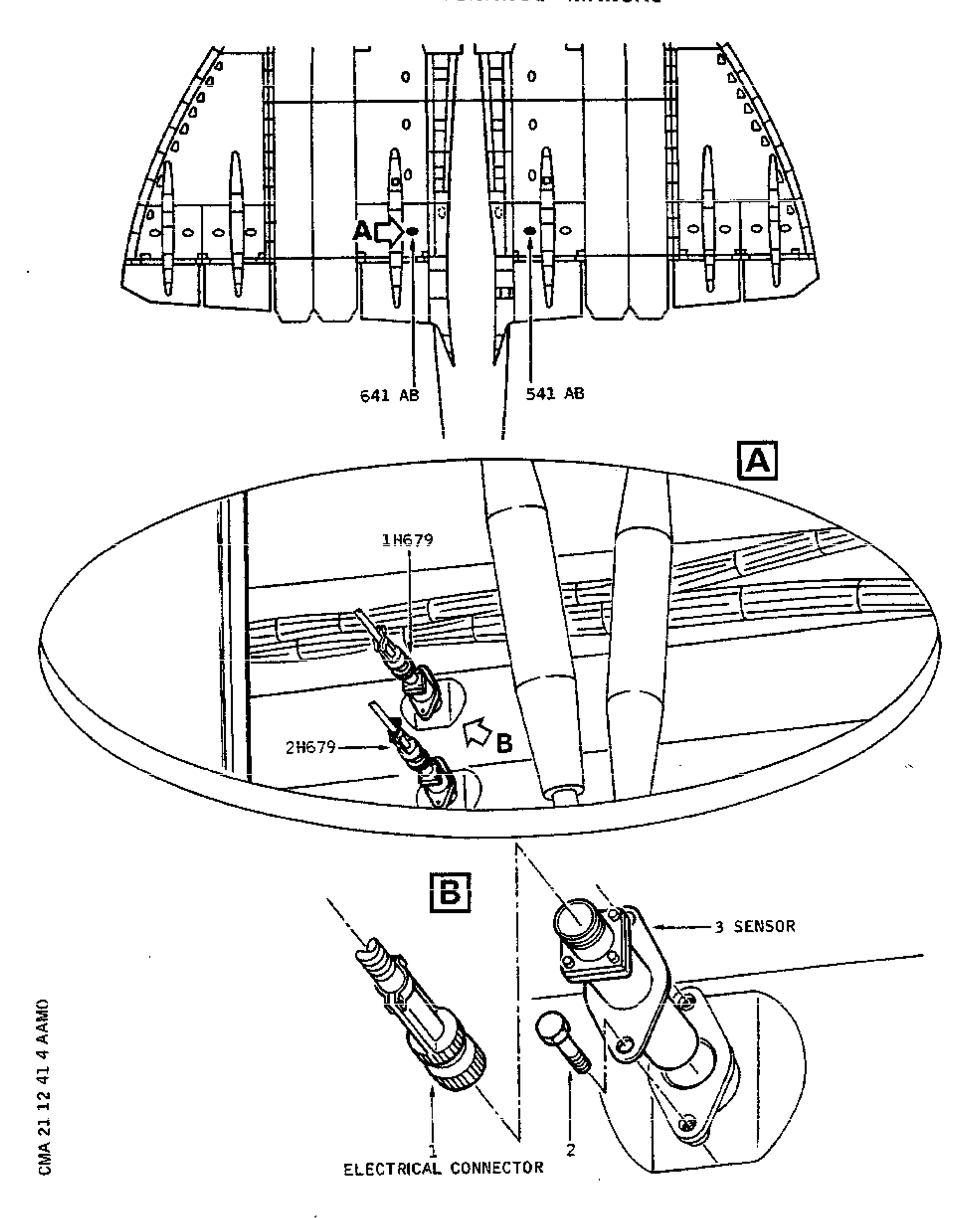
E. Test

Ref. 21-12-42, Adjustment/Test, paragraphes 3A, 3B, 3C.

F. Close Up

(1) Close access doors

(2) Remove safety clip and tag and reset the circuit breaker tripped in paragraph 2 B (2).



Overheat Thermoswitch
Figure 401

CABIN ISOLATION VALVE - REMOVAL/INSTALLATION

1. General

The cabin isolation valve removal/installation procedure is identical for each air conditioning group.

2. Cabin Isolation Valve

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 2.96 m (9 ft. 8 in.)	
Safety Clips	

B. Prepare

(1) Trip, safety and tag the following circuit breakers :

Group 1

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
	1-213	1H 612	D11
		1H 680	E12

Group 2

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
	5-213	2H 612	A 9
		2H 680	E10

Group 3

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
	15-213	3H 612	A 3
		3H 680	F 3

Group 4

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
	15-216	4H 612	A24
		4H 680	F25

(2) Position access platform.

(3) Open access door 151CB.

D. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1).

(2) Remove nut (3), bolt (4) and retain washer (5) ; hold bonding strips (6) (7)

(3) Undo the lacing of heat insulàting sleeve (2) and remove it.

(4) Remove clamps (8) and (9).

(5) Remove valve (10).

(6) Check condition of seal (11) ; discard it if necessary.

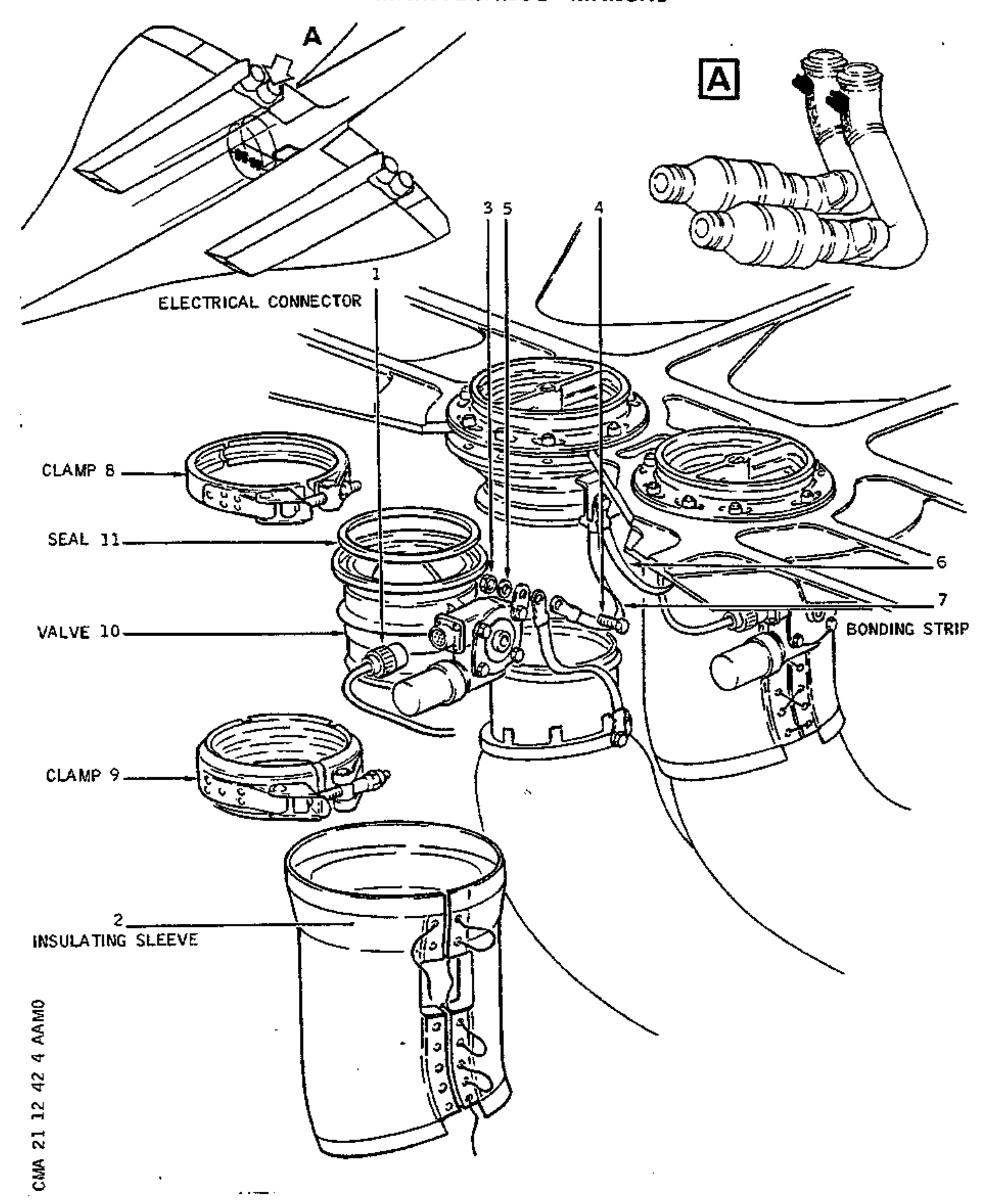
E. Install

(1) Install valve (10) fitted with a new seal if necessary.

(2) Install clamps (8) and (9).

(3) Install heat insulating sleeve (2), lace it.

(4) Install bonding strips (6) and (7) by means of screw (4) nut (3) and washer (5).



Cabin Isolation Valve Installation
Figure 401

R

(5) Connect electrical connector (1).

R F. Test

R Ref. 21-12-42, Adjustment/Test

R G. Close-Up

(1) Close access door.

(2) Remove access platform.

R (3) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2 B (1).

CABIN ISOLATION VALVE - ADJUSTMENT/TEST

1. General

There are 4 cabin isolation valves ; the test procedure is identical for each of them.

2. Operational Test

A. Equipment and Materials

DESCRIPTION	PART NO.
1 Electrical Ground Power Unit	
1 Ground Air Supply Unit : - Relative Minimum Pressure : 2 bars, Airflow 0.4 kg/sec. - Relative Maximum Pressure : 4.5 bars, Airflow 0.6 kg/sec. - Temperature must not exceed 300°C	

B. Prepare

(1) Connect ground air supply unit and pressurize the aircraft.

R (2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(3) Pressurize Fuel System

WARNING : OBSERVE FUEL SYSTEM SAFETY PRECAUTIONS DESCRIBED IN 28-00-00 AND 28-10-00.

NOTE : Pressurization assumes a minimum quantity of fuel of 2500 Kg in the appropriate feed tank (1, 2, 3, 4).

On centre console, place throttle control levers in SHUT position (lower mechanical stop)
Check that crossfeed valves are closed and that associated magnetic indicators display vertical stripes.
With the LP VALVE switch locked at OPEN by the switch guard, check that the associated magnetic indicator shows an in-line indication.

Place first of the three ENGINE FEED PUMPS control switches in ON position (MAIN PUMP).

Engine 1 Main Fuel Pump for group 1
Engine 2 Main Fuel Pump for group 2
Engine 3 Main Fuel Pump for group 3
Engine 4 Main Fuel Pump for group 4

Check that corresponding LOW PRESS indicator light goes off when pump operating pressure is reached.

WARNING : FUEL SYSTEM MUST NOT OPERATE MORE THAN 2 HOURS.

In case Fuel System cannot be used.
Trip, safety and tag the following circuit breakers :

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
	For GRP 1			
	LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
R R	ENG 1 B/VALVE CONT & OVER PRESS IND		1H 611	D10
	For GRP 2			
	LH UC WEIGHT SW B SYS SUP	3-213	G 293	B 8
R R	ENG 2 B/VALVE CONT & OVER PRESS IND	5-213	2H 611	A 8
	For GRP 3			
	RH UC WEIGHT SW B SYS SUP	3-213	G 294	B 9
R R	ENG 3 B/VALVE CONT & OVER PRESS IND	15-215	3H 611	A 4
	For GRP 4			
	RH UC WEIGHT SW A SYS SUP	1-213	G 295	M18
R R	ENG 4 B/VALVE CONT & OVER PRESS IND	15-216	4H 611	A23

WARNING : DURING TEST, FUEL EXCH WARNING LIGHT MAY

ILLUMINATE. ON PANEL 2=214 PLACE FUEL VALVE SWITCH IN OPEN POSITION (SELF-HOLDING CANCELLATION).

(4) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP 1 AIR COND VALVE CLOSE AND AIR GEN IND	1-213	1H 612	D11
GRP 2 AIR COND VALVE CLOSE AND AIR GEN IND	5-213	2H 612	A 9
GRP 3 AIR COND VALVE CLOSE AND AIR GEN IND	15-215	3H 612	A 3
GRP 4 AIR COND VALVE CLOSE AND AIR GEN IND	15-216	4H 612	A24
GRP 1 ENTRY SAFETY VALVE SUP	1-213	1H 680	E12
GRP 2 ENTRY SAFETY VALVE SUP	5-213	2H 680	E10
GRP 3 ENTRY SAFETY VALVE SUP	15-215	3H 680	F 3
GRP 4 ENTRY SAFETY VALVE	16-216	4H 680	F25

C. Test

(1) On AIR BLEED CONTROL panel 2-214, place CROSS BLEED and COND VALVE switches in ON position.

(2) Read pressure value on pressure gauge.

(3) On TEMPERATURE CONTROL panel, check that air flow is correct at MASS FLOW indicator.

(4) In zone 151 for group 1 and 2, and 152 for group 3 and 4, check cabin isolation valve attachment clamps for evidence of leakage.

(5) On AIR BLEED CONTROL panel 2-214, place COND VALVE switch in OFF position and CROSS BLEED switch in SHUT position.

IMPORTANT :

(6) Shut down ground air supply unit.

R (7) On panel 2-214, press DUCT warning light for some seconds until it illuminates.

(8) Release DUCT indicator light ; it remains illuminated during 3 to 5 seconds (valve opening time).

(9) De-energize the aircraft electrical network and disconnect electrical ground power unit.

(10) Disconnect ground air supply unit.

3. Functional test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	-
Test Set - Wing Overheat Thermal Switch	BE101

B. Prepare

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(2) On AIR BLEED CONTROL panel 2-214, place BLEED VALVE switch in OPEN position.

(3) For group 1 or 2, open access door AB in Zone 541 under LH wing, for group 3 or 4 open access door AB in
B zone 641 under RH wing. Place the test set near the
B appropriate access panel. Rig the 115V-400Hz, power
B supply cable (PN 417280) to the set from A/C test
B socket D116-A on panel 18-216 of the RH forward
B racking in the Flight compartment.

(4) Remove overheat thermoswitch 1H679 (2H679, 3H679, 4H679) from duct.

B (5) Connect the test set as shown in attached figure.
B Insert overheat thermoswitch in metallic cylinder.

(6) Check that circuit breakers mentioned in para. 2.B. (4) are set.

(7) Energize test set BE101.

C. Test

B (1) On test set, set main switch to MARCHE (ON).

B (a) Green (Power on) indicator light illuminates.
B Red CHAUFFAGE (HEAT ON) indicator light
B illuminates.

B (b) Set Rheostat control to 0 (max. heat) until
B temperature rises to half-way to TS 109 green
B band. Then turn rheostat control to approx. 80
B position so that rate of approach to switch
B setting is more gradual.

B (c) As the thermal switch operates, CHAUFFAGE
B indicator light goes off, AVION (overheat
B warning monitor) light illuminates. Check that
B this occurs within the TS 109 green band.

(2) Cabin isolation valve closes.

(3) AIR warning light on master warning panel and DUCT warning light come on. The gong sounds.

B (4) De-energize test set BE101 by switching main Switch to
B ARRET (OFF). Green light extinguishes.

(5) Remove overheat thermoswitch from test set BE101 heating cylinder.

(6) Wait until overheat thermoswitch is cold.

(7) AIR warning light on master warning panel and DUCT warning light remain illuminated.

(8) Place BLEED VALVE switch in SHUT position. AIR warning light goes off.
3 sec to 5 sec later, DUCT warning light goes off, which means that warning self holding system operates correctly.

(9) Install overheat detector in its location.

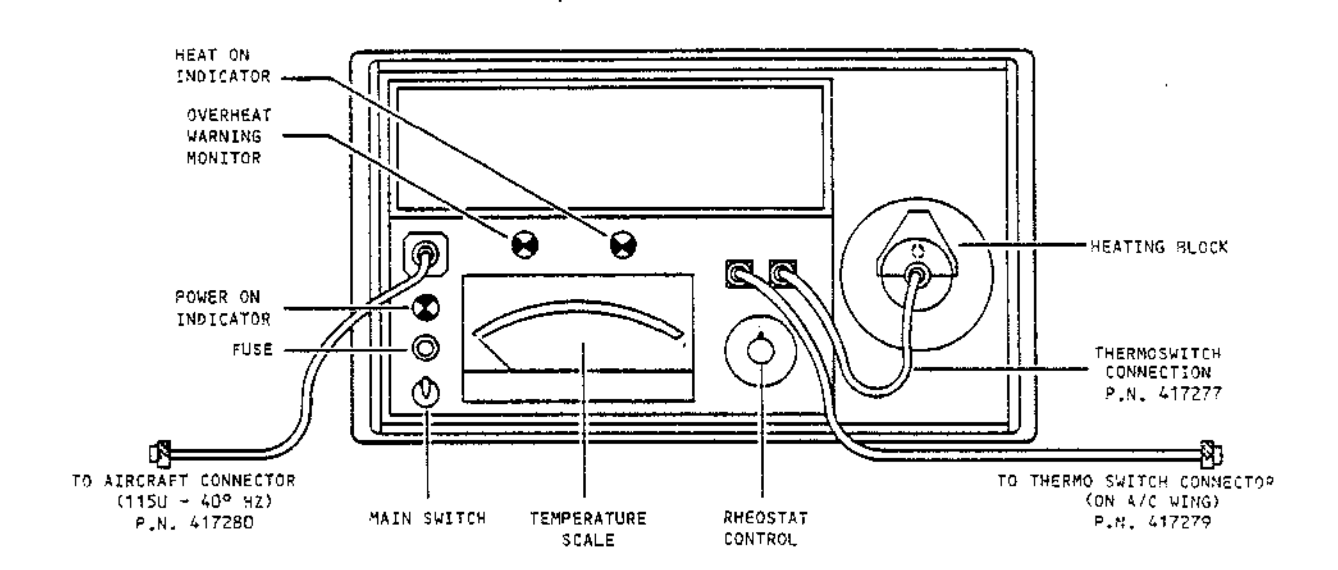
(10) Close access door which has been opened.

(11) In case the fuel has been pressurized.

Place ENGINE FEED PUMP switch in OFF position. After a few seconds the corresponding LOW PRESS indicator light must illuminate.

If necessary, remove clip and tag and reset circuit breaker tripped in para. 2.B.(3). If FUEL EXCH warning has come on during test after switching off the ground air supply unit, wait for cancellation of warning and place FUEL VALVE switch in AUTO position.

(12) De-energize the aircraft electrical network and disconnect electrical ground power unit.



BE 101 Test Set
Figure 501

COLD AIR UNIT OUTLET OVERPRESSURE PRESSURE SWITCH REMOVAL/INSTALLATION

1. General

The removal procedure is identical for overpressure pressure switches of each group. They are located on the same plate under the cabin floor between frames 68 and 69.

2. Cold Air Unit Outlet Overpressure Pressure Switch

A. Equipment and Materials

DESCRIPTION	PART NO.
Corrosion Resistant Lockwire 0.032 inch (0.8 mm)	
Circuit Breaker Safety Clips	

B. Prepare

(1) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP 1 AIR COND VALVE CLOSE AND AIR GEN IND	1-213	1H 612	D11
GRP 2 AIR COND VALVE CLOSE AND AIR GEN IND	5-213	2H 612	A 9
GRP 3 AIR COND VALVE CLOSE AND AIR GEN IND	15-215	3H 612	A 3
GRP 4 AIR COND VALVE CLOSE AND AIR GEN IND	15-216	4H 612	A24

(2) Open floor panel 241BF.

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1) 1 (2, 3, 4) H 659A.

(2) Disconnect union (3).

(3) Remove screws (5) and (6).

(4) Cut lockwire and remove clamp (7).

(5) Remove overpressure pressure switch 1, 2, 3 or 4(H659).

(6) Loosen locknut (8).

(7) Remove union (4) and filter (2) from overpressure pressure switch.

D. Preparation of Replacement Component

(1) Install filter (2) fitted with a new seal (10).

(2) Install union (4) provided with locknut (8) and new seals (9). Screw union fully in threaded boss so that it lines up with pipe union.

E. Install

(1) Install overpressure pressure switch 1, 2, 3 or 4(H659) on its support ; install and tighten both screws (5) and (6).

R (2) Install and tighten clamp (7).

(3) Install union (4) until it is lined up with relevant pipe.

R (4) Install and tighten union (3).

(5) Tighten locknut.

(5) Wirelock filter (2) and clamp (7).

(6) Connect electrical connector (1) 1 (2, 3, 4) H 659A.

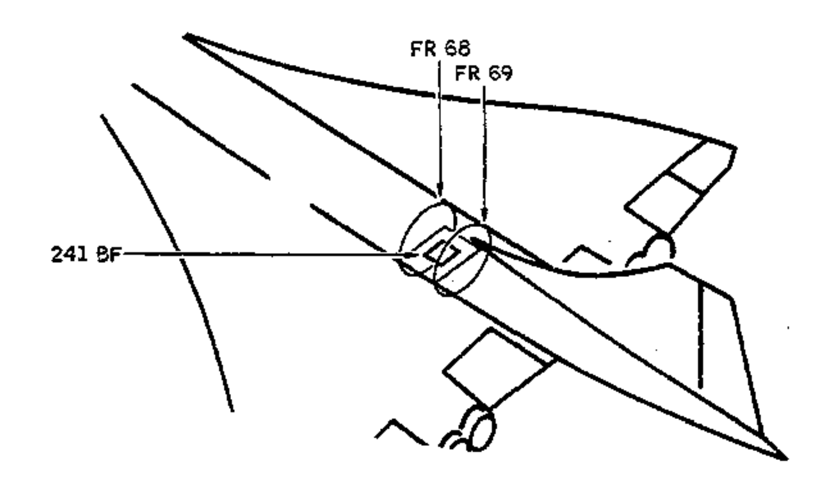
R F. Test

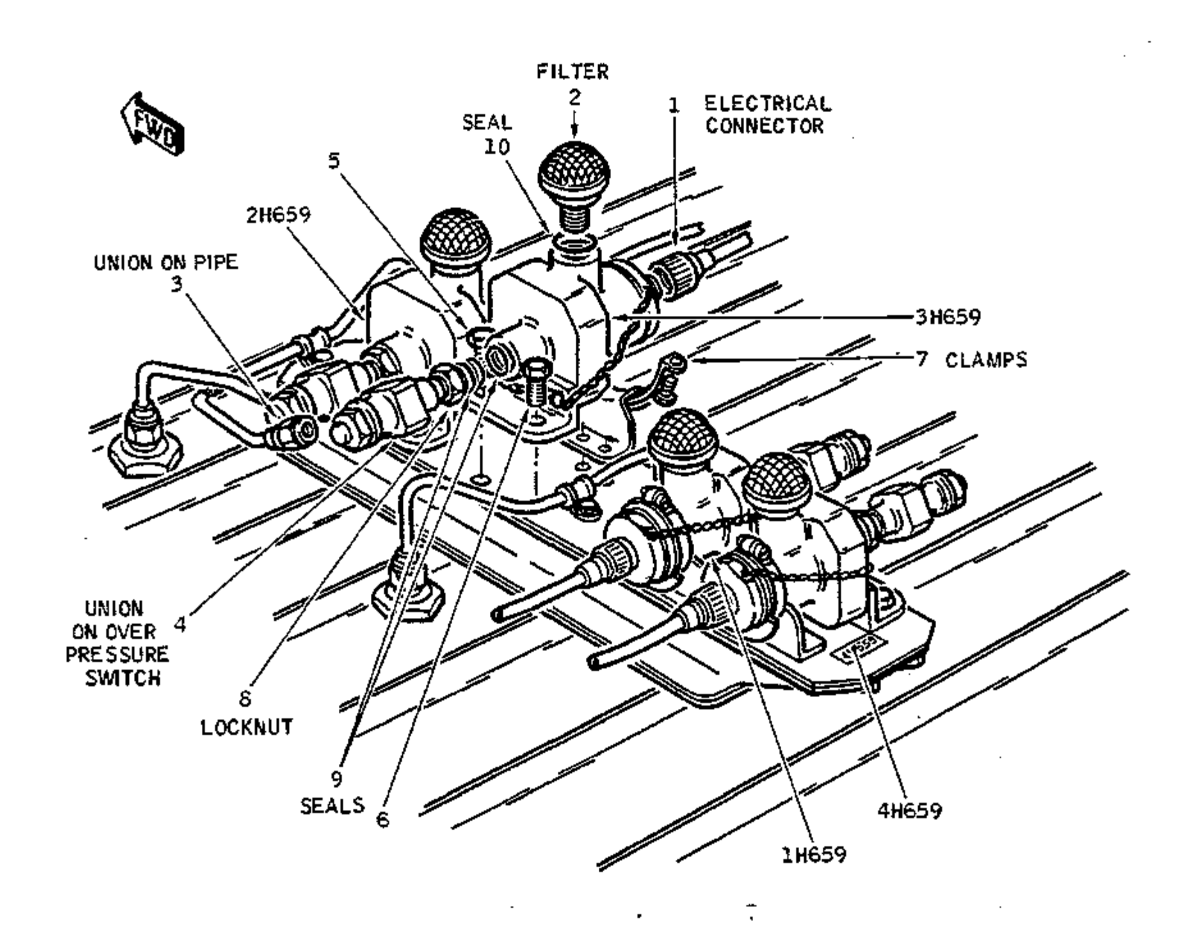
R Ref. 21-12-61, Adjustment/Test

R G. Close-Up

(1) Remove safety clip and tag and reset the circuit breaker tripped in paragraph B. (1).

(2) Close floor panel.





R

Cold Air Unit Outlet Overpressure Pressure Switch
Figure 401

R COLD AIR UNIT OUTLET OVERPRESSURE PRESSURE SWITCH ADJUSTEMENT TEST

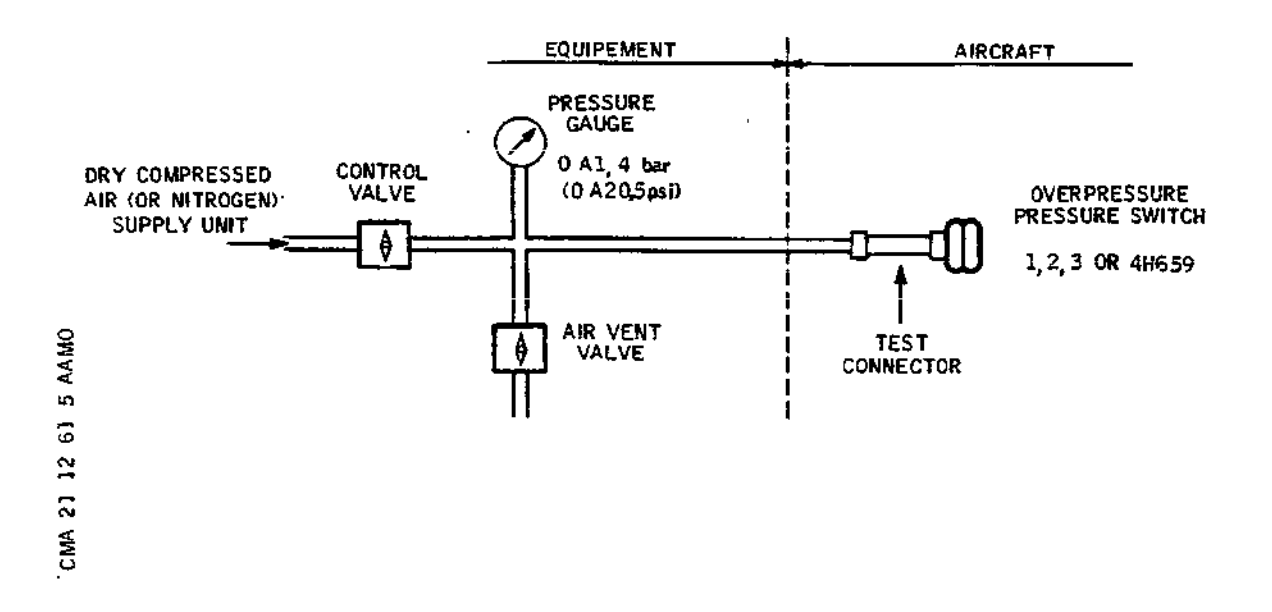
1. General

The test procedure for the cold air unit outlet overpressure pressure switch is identical for the four groups.

2. Functional Test

A. Equipment and Materials (Ref. Fig. 501)

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Dry compressed Air (or Nitrogen) Supply Unit Providing a Pressure of 1.4 bar (or 20.5 psi)	
Pressure Reducing Valve 0 - 1.4 bar	
R Coupling Adaptors - Testing, Air Conditioning System Components	D921602100
R Test Equipment Arranged According to Figure Below	



Test Equipment
Figure 501

B. Prepare

RB (1) Open floor panel 241BF.

(2) On overpressure pressure switch 1, 2, 3 or 4H659 unscrew and remove blanking caps from test connector.

(3) Install coupling adaptor D921602100 and connect test equipment arranged according to the figure.

(4) Check that master warning and aural warning circuit breakers are set, also check that the circuit breaker associated with the group on which overpressure pressure switches are tested, is set.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
MSW SUP 1	1-213	W 252	N21
AUDIO WARN SYS SUP 1		W 371	M21
MSW SUP 2	5-213	W 251	D15
AUDIO WARN SYS SUP 2		W 372	C17
For Group 1 GPR 1 AIR COND VALVE CLOSE & AIR GEN IND	1-213	1H 612	D11
For Group 2 GPR 2 AIR COND VALVE CLOSE & AIR GEN IND	5-213	2H 612	A 9
For Group 3 GPR 3 AIR COND VALVE CLOSE & AIR GEN IND	15-215	3H 612	A 3
For Group 4 GPR 4 AIR COND VALVE CLOSE & AIR GEN IND	15-216	4H 612	A24

(5) On AIR BLEED CONTROL panel 2-214, on Flight Engineer's instrument panel, place COND VALVE switch, related to group dealt with (ENG 1, 2, 3 or 4), in ON position.

(6) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(7) Place MAIN PUMP switch associated with the relevant
R group in ON position. Wait until LOW PRESS caption light goes off.

C. Test

R (1) Test of time delay relay 1 (2, 3, 4) H712

R (a) Disconnect overpressure pressure switch 1 (2,3,4)
R H659.

R (b) On connector 1 (2, 3, 4) H659A, shunt terminals
R A and B.
R - check that warning light comes on 2 seconds
R after contact is made with shunt.
R - AIR warning light comes on and single stroke

gong sounds.

(c) Remove shunt from connector 1 (2, 3, 4) H659A and connect plug to overpressure pressure switch.

(d) On AIR BLEED CONTROL panel 2-214, place 1, 2, 3 or 4 COND VALVE switch in OFF position. DUCT and AIR warning lights go off ; single stroke gong stops.

(e) Place COND VALVE switch in ON position. DUCT and AIR warning lights remain extinguished ; the gong does not sound.

(2) Test of overpressure pressure switch with pressure.

NOTE : Slowly increase test pressure until pressure switch operating pressure is reached (700 ± 35 mb (10.15 ± 0.5 psi)).
DUCT warning light control relay is delayed by 2 seconds.

(a) By means of arranged test equipment apply a gradually increasing pressure. Increase pressure from 550 to 800 mb (or 7.2 to 11.6 psi). For a pressure value of 700 ± 35 mb (or 10.15 ± 0.5 psi) on AIR BLEED CONTROL panel 2-214 (and for corresponding group 1, 2, 3 or 4):

- DUCT warning light comes on on panel 4-211, master warning panel W254.
- AIR warning light comes on.
- The gong sounds.

(b) On AIR BLEED CONTROL panel 2-214, place COND VALVE switch (1, 2, 3 or 4) in OFF position.
- AIR warning light goes off.
- The gong stops.
- DUCT caption light remains illuminated.

(c) Relieve pressure applied to overpressure pressure switch down to zero
- DUCT warning light goes off.

(d) Return COND VALVE switch to ON position.
- DUCT and AIR warning lights remain extinguished
- The gong does not sound.

D. Close-Up

(1) On AIR BLEED CONTROL Panel 2-214, place COND VALVE switch in OFF position.

(2) Return MAIN PUMP switch to OFF position.

(3) De-energize the aircraft electrical network and disconnect electrical ground power unit. (Ref. 24-41-00, Servicing).

(4) Remove test equipment and coupling adaptor D921602100.

(5) Install blanking cap on overpressure pressure switch test connector.

RB (6) Install floor panel 241BF.

WATER TRAP - ADJUSTMENT/TEST

1. General

The purpose of this test is to check the water traps for evidence of leakage

2. Test

A. Equipment Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Ground Air Supply Unit - Relative Minimum Pressure 2 bars Airflow 0.4 Kg/Sec - Relative Maximum Pressure 4.5 bars Airflow 0.6 Kg/Sec - Temperature must not exceed 300° C	
Circuit breaker Safety Clips	
Access Platform 2.96 m (9 ft. 8 in)	

B. Prepare

(1) For group 1, 2, 3 and 4 water traps located between FR68 and FR69 :

(a) Position access platform

(b) Open access door 151 GB

(2) To gain access to group 1 and 2 water traps

(a) Open access door 535 AT

(3) To gain access to group 3 and 4 water traps

(a) Open access door 635 AT

(4) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 21-41-00, Servicing)

(5) Connect ground air supply unit

(6) On AIR BLEED CONTROL panel 2214, check that switches are in the following positions :

BLEED VALVE switch in SHUT position
CROSS BLEED switch in SHUT position
COND VALVE switch in OFF position

(7) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GR1 AIR COND VALVE CLOSE AND AIR GEN. IND	1-213	1H 612	D11
GR2 AIR COND VALVE CLOSE AND AIR GEN IND	5-213	2H 612	A 9
GR3 AIR COND VALVE CLOSE AND AIR GEN IND	15-215	3H 612	A 3
GR4 AIR COND VALVE CLOSE AND AIR GEN IND	15-216	4H 612	A24
GR1 AIR COND VALVE EMER CLOSE SUP	1-213	1H 667	F13
GR2 AIR COND VALVE EMER CLOSE SUP	5-213	2H 667	A10
GR3 AIR COND VALVE EMER CLOSE SUP	15-215	3H 667	F 2
GR4 AIR COND VALVE EMER CLOSE SUP	15-216	4H 667	F26
GRP1 AIR GEN CONT & IND	1-213	1H 682	D13
GRP2 AIR GEN CONT & IND	5-213	2H 862	F 9
GRP3 AIR GEN CONT & IND	15-215	3H 862	B 3
GRP4 AIR GEN CONT & IND	15-216	4H 862	B23

(8) Pressurize the fuel system.

CAUTION : OBSERVE THE FUEL SYSTEM SAFETY PRECAUTIONS DESCRIBED IN 28-00-00 AND 28-10-00.

NOTE :

(a) Pressurization requires a minimum quantity of fuel of 2500 Kg in the appropriate feed tank (group 1, 2, 3, 4).

(b) On centre console, place throttle control lever in SHUT position (lower mechanical stop).

(c) Check that crossfeed valves are shut, and that associated magnetic indicators display vertical stripes.

(d) With the LP valve switch locked in OPEN position by the switch guard check that the associated magnetic indicator displays an in-line indication.

(e) Place the first of the three ENGINE FEED PUMPS control switches in ON position (main pump).
Engine 1 Main Fuel Pump for group 1
Engine 2 Main Fuel Pump for group 2
Engine 3 Main Fuel Pump for group 3
Engine 4 Main Fuel Pump for group 4

Check that associated LOW PRESS caption light extinguishes when pump operating pressure is reached.

CAUTION : FUEL SYSTEM MUST NOT OPERATE MORE THAN 2 HOURS.

(9) In case fuel system cannot be used.
Trip, safety and tag the following landing gear relay circuit-breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
For group 1			
LH UC WEIGHT SW "A" SYS SUP	1-213	G 292	M17
For group 2			
LH UC WEIGHT SW "B" SYS SUP	3-213	G 293	B 8
For group 3			
RH UC WERGHT SW :B: SYS SUP	3-213	G 294	B 9
For group 4			
RH UC WEIGHT SW "A" SYS SUP	1-213	G 295	M18

CAUTION : THE FUEL EXCH WARNING LIGHT CAN ILLUMINATE DURING THE TEST.

ON AIRBLEED CONTROL PANEL 2-214, PLACE FUEL VALVE SWITCH IN OPEN POSITION, TO CANCEL WARNING.

C. Test

(1) Start up the ground air supply unit.

(2) On AIR BLEED CONTROL panel, place the following switches in positions indicated :

(a) CROSS BLEED switch in OPEN position.
- CROSS BLEED magnetic indicator turns to horizontal position.

(b) COND VALVE switch in ON position.
- COND VALVE magnetic indicator, after a short delay, turns to horizontal position.

(3) On TEMPERATURE CONTROL panel, MASS FLOW indicator reading must increase.

(4) Check for evidence of leakage at level of water traps through access doors 151CB for groups 1-2-3-4, 535A for groups 1 and 2 and 635AT for groups 3 and 4.
There must be no leakage

(5) Place COND VALVE switch in OFF position.

(6) Place CROSS BLEED switch in SHUT position.

(7) Shut down air supply unit.

D. Close-Up

(1) In the case where the fuel system has been pressurised :
Return ENGINE FEED VALVE switch to OFF position. After a short delay the associated LOW PRESS warning light must illuminate.

(2) In the case where LG relay circuit breakers have been tripped :
Remove safety clips and tags, and re-set circuit breakers tripped in para. 2 B (8).

(3) If FUEL EXCH warning light illuminates during the test, after shutting down air supply unit wait for warning light to extinguish, and place FUEL VALVE switch in AUTO position again.

(4) Disconnect electrical ground power unit, and de-energize the aircraft electrical network.

(5) Close access doors opened in paragraph 2 B (1).

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WATER TRAP - INSPECTION/CHECK

1. General

The water traps are installed in the turbine downstream overpressure sensing system.
There are two water traps in each turbine downstream overpressure system for each air conditioning group.
The traps are located between FR68 and FR69 in the aircraft centreline and between ribs 18 and 19 at level of spar 70 on LH and RH wings.

2. Water Traps

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 2.96 m (9 ft. 8 in.)	
Corrosion Resistant Steel Lockwire 0.8 mm (.032 in.)	

B. Prepare

(1) For group 1, 2, 3 and 4 traps, located between FR68 and FR69 :

(a) Install access platform

(b) Open access door 151CB

(2) For group 1 and 2 water traps :

(a) Open access door 535AT

(3) For group 3 and 4 water traps :

(a) Open access door 635AT

C. Inspection/Check

(1) Cut and remove lockwire securing water trap (the traps are wirelocked in pairs).

(2) Loosen and remove trap.

(a) Clean interior of trap.

(b) If trap contains water, empty, clean and dry it.

(3) Install trap, equipped with new seal.

(4) Safety water traps, in pairs, using lockwire.

D. Leakage Test

Refer to 21-12-62, Adjustment/Test

E. Close-Up

(1) Remove access platform.

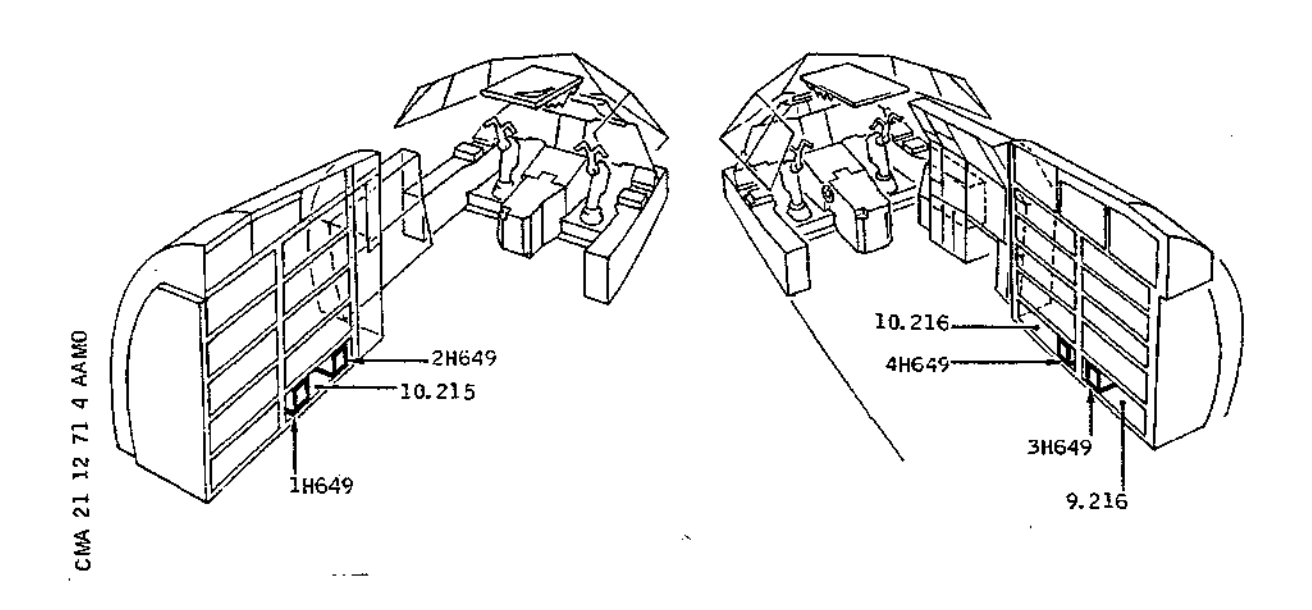
(2) Close access doors.

OVERHEAT SAFETY BOX - REMOVAL/INSTALLATION

1. General

A. The removal/installation procedure is identical for all overheat safety boxes; only location is different

2. Overheat Safety Box (Ref. Fig. 401)



Location of Overheat Safety Box
Figure 401

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Electrical Ground Power Unit	

B. Prepare

(1) On electronics racks, open the relevant panels :

R Panel 10-215 for overheat safety boxes of groups 1 and 2
R Panel 9-216 for overheat safety boxes of group 3
R Panel 10-216 for overheat safety boxes of group 4

(2) Trip, safety and tag the following circuit breakers :

(a) For group 1 overheat safety box

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 AIR COND VALVE CLOSE & AIR GEN IND	1-213	1H 612	D11
GRP1 FUEL VALVE CONT		1H 863	D16

(b) For group 2 overheat safety box

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP2 AIR COND VALVE CLOSE & AIR GEN IND	5-213	2H 612	A 9
GRP2 FUEL VALVE CONT	4-213	2H 863	E12

(c) For group 3 overheat safety box

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP3 AIR COND VALVE CLOSE & AIR GEN IND	15-215	3H 612	A 3
GRP3 FUEL VALVE CONT	2-213	3H 863	F16

(d) For group 4 overheat safety box

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP4 AIR COND VALVE CLOSE & AIR GEN IND	15-216	4H 612	A24
GRP4 FUEL VALVE CONT	4-213	4H 863	B11

C. Remove

(1) Unscrew attaching nut until it is out of the tab.

(2) Move the screw and nut assembly downwards.

(3) Pull overheat safety box; hold to prevent it from falling when it is out of the rack.

D. Preparation of Replacement

(1) Make certain that electrical connector (on rack side and on box side) is in good condition.

(2) Check that overheat safety box is free from dents or traces of corrosion.

E. Install

R (1) Push overheat safety box in its location.

(2) Lift the screw and nut assembly and screw the latter in tab on foward face of safety box.

R (3) Tighten nut fully

F. Tests

(1) Connect electrical ground power unit and energize the
R aircraft electrical network (Ref. 24-41-00, Servicing)

(2) Remove safety clips and tags and reset the following circuit breakers :

(a) for overheat safety box of group 1

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 AIR COND VALVE CLOSE & AIR GEN IND	1-213	1H 612	D11

(b) for overheat safety box of group 2

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP2 AIR COND VALVE CLOSE & AIR GEN IND	5-213	2H 612	A 9

(c) for overheat safety box of group 3

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R GRP3 AIR COND VALVE CLOSE & AIR GEN IND	15-215	3H 612	A3

(d) for overheat safety box of group 4

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP4 AIR COND VALVE CLOSE	15-216	4H 612	A24

(3) On Flight Engineer's instrument panel, panel 2-214, AIR BLEED CONTROL section :
R PRIM EXCH - SEC EXCH - FUEL EXCH - DUCT warning
R lights of group associated with removed overheat safety box must come on.

(4) Set the following circuit breakers :

(a) for group 1 overheat safety box

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 FUEL VALVE CONT	2-213	1H 863	D16

(b) for group 2 overheat safety box

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP2 FUEL VALVE CONT	4-213	2H 863	E12

(c) for group 3 overheat safety box

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP3 FUEL VALVE CONT	2-213	3H 863	F16

(d) for group 4 overheat safety box

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP4 FUEL VALVE CONT	4-213	4H 863	B11

R (5) PRIM EXCH - SEC EXCH - FUEL EXCH - DUCT warning
R lights of group associated with removed overheat safety box must go off

G. Test

Carry out the test procedure described in 21-10-00, Adjustment/Test, paragraphs 2A-2B-3B-3C-3D-3E-3F-3H.

H. Close Up

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(2) Make certain that working area is clean and clear of

tools and miscellaneous items of equipment

(3) On electronics racks close the relevant panels :

R Panel 10-215 for group 1 and 2 overheat safety box
Panel 9-216 for group 3 overheat safety box
Panel 10-216 for group 4 overheat safety box.

ROTARY TEST SWITCH - REMOVAL/INSTALLATION

WARNING : OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN CHAPTER 24-00-00.

1. General

Removal/Installation of rotary test switch H648 on panel 23-214 and of test switch H647.

2. Rotary Test Switch

CAUTION : ELECTRO LUMINESCENT PANELS ARE VULNERABLE TO DAMAGE BY SCRATCHING AND CRACKING. ENSURE THAT TUBULAR SPANNERS DO NOT DAMAGE THE POLISHED WALL OF THE PANEL CUT-OUTS.

A. Prepare

(1) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 G.A.U. DUCT TEMP IND	1-213	1H 612	D11
M.W.S. SUP 1		W 252	N21
FUEL VENT PROTN SYS SUP		W 501	P21
GRP1 FUEL VALVE CONT	2-213	1H 863	D16
GRP3 FUEL VALVE CONT		3H 863	F16
ENG1 N2 RPM IND		1E 241	D10
ENG2 N2 RPM IND		2E 241	D11
ENG3 N2 RPM IND		3E 241	D12
ENG4 N2 RPM IND		4E 241	D13
ENG1 EXHAUST GAS TEMP IND		1E 301	G12
ENG2 EXHAUST GAS TEMP IND		2E 301	B12
ENG3 EXHAUST GAS TEMP IND		3E 301	B13
ENG4 EXHAUST GAS TEMP IND		4E 301	G13
GRP2 FUEL VALVE CONT	4-213	2H 863	E12
GRP4 FUEL VALVE CONT		4H 863	B11
ENG1 N1 RPM IND		1E 151	D19
ENG2 N1 RPM IND		2E 151	C19
ENG3 N1 RPM IND		3E 151	C20
ENG4 N1 RPM IND		4E 151	D20
TANK PRESS IND SUP		D 211	G 3
GRP2 AIR COND VALVE	5-213	2H 612	A 9

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
CLOSE AIR GEN IND MWS SUP2		W 251	D15
GRP3 AIR COND VALVE CONT IND PRESS IND	15-215	3H 612	A 3
GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24

(2) Remove quick release fasteners, withdraw the panel forwards ; disconnect electrical connectors.

(3) On removed panel, remove dust cover attachment screws ; remove dust cover.

B. Remove (Ref. Fig. 401)

(1) If necessary release the cable loom ties to facilitate access to terminals ; identify electrical cables.

(2) Using a suitable tool, remove pins from connectors.

(3) Remove knob cap.

(4) Remove the knob clutchnut from knob ; pull knob forwards.

(5) Unlock and unscrew attaching nut.

(6) Remove the locking washer and withdraw the switch from the rear of the panel.

C. Install

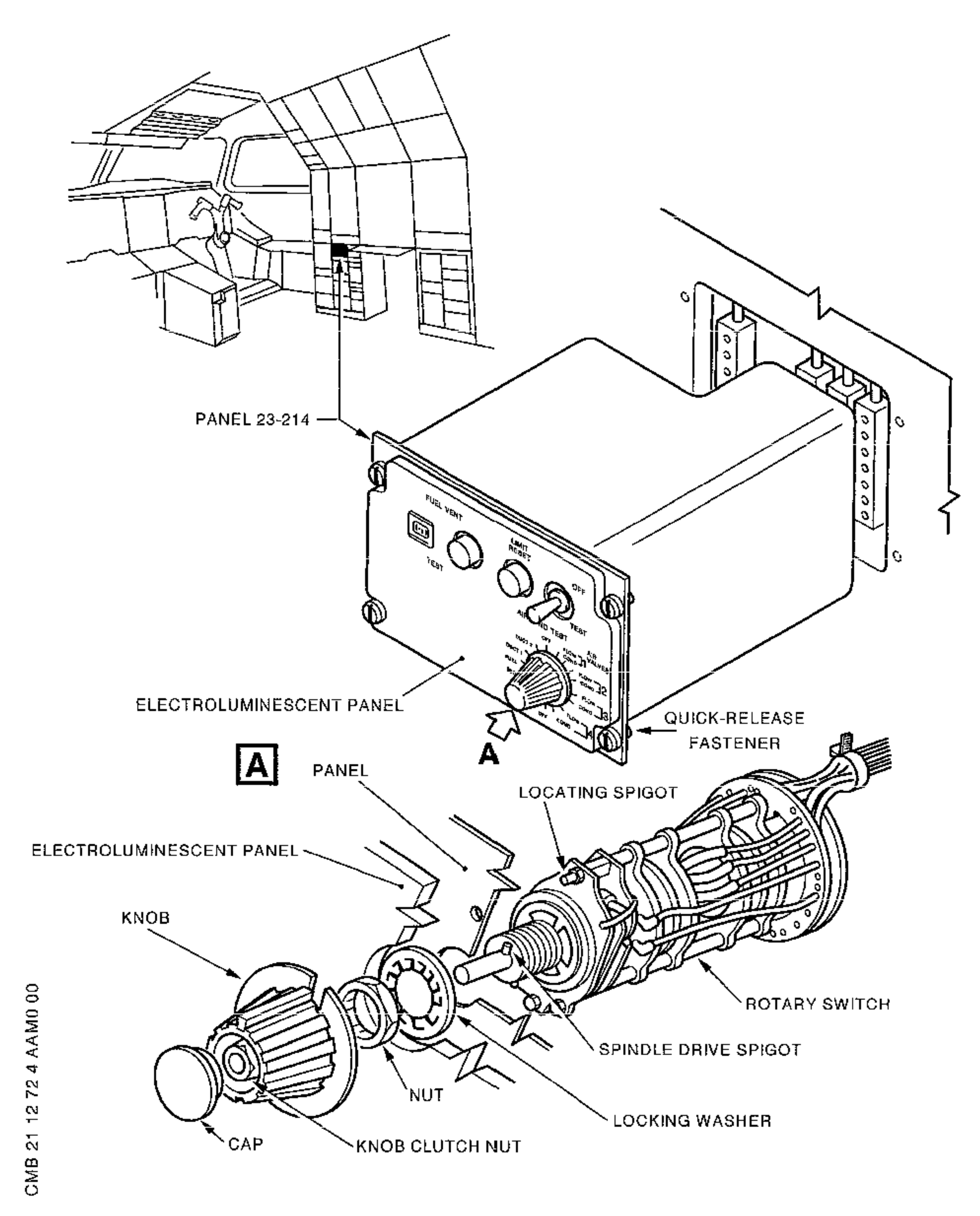
(1) Observe the electrical safety precautions.

(2) Install rotary test switch from the rear of the panel.

(3) Install locking washer ; screw attaching nut.

(4) Fit the knob on the switch spindle, making certain that the spindle drive spigot is engaged with the slot in the knob ; tighten the knob clutchnut.

(5) Install cap on knob.



Rotary Test Switch - Removal/Installation
Figure 401

(6) Using a suitable tool, connect the electrical cables to the connector ensuring that the connections are made in accordance with identification labels and corresponding wiring diagrams.

(7) If necessary secure electrical cables with ties.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(8) Install dust cover on the rear of panel. Screw attaching screws.

(9) Connect electrical connector to the unit in accordance with connector identifications.

(10) Insert the panel into the structure. Attach with the quick release fasteners.

CAUTION : WHEN INSERTING THE PANEL, MAKE CERTAIN THAT CABLES ARE NOT TRAPEBED OR DISTORDED.

(1) Cancel the electrical safety precautions and check the operation of rotary test switch by carrying out the following test procedure (Reference 21-10-00, ADJUSTEMENT/TEST).

(a) Operational Tests. Indicator Lights Test.

(b) Operational Test of Warning Indicators.

1) PRIM EXCH OVER-HEAT and MASTER WARNING Channel 1 Test.

2) SEC EXCH OVER-HEAT and MASTER WARNING Channel 2 Test.

3) Fuel Overheat Test.

4) DUCT 1 Overheat and Master Warning Channel 3 Test.

5) DUCT 2 Overheat and Master Warning Channel 4 Test.

6) Close-up.

3. Test Switch H647

CAUTION : ELECTRO LUMINESCENT PANELS ARE VULNERABLE TO DAMAGE BY SCRATCHING AND CRACKING. ENSURE THAT TUBULAR

SPANNERS DO NOT DAMAGE THE POLISHED WALL OF THE PANEL CUT OUTS.

A. Prepare

(1) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 G.A.U. DUCT TEMP IND	1-213	1H 612	D11
M.W.S. SUP 1		W 252	N21
FUEL VENT PROTN SYS SUP		W 501	P21
GRP1 FUEL VALVE CONT	2-213	1H 863	D16
GRP3 FUEL VALVE CONT		3H 863	F16
ENG1 N2 RPM IND		1E 241	D10
ENG1 N2 RPM IND		2E 241	D11
ENG3 N2 RPM IND		3E 241	D12
ENG4 N2 RPM IND		4E 241	D13
ENG1 EXHAUST GAS TEMP IND		1E 301	G12
ENG2 EXHAUST GAS TEMP IND		2E 301	B12
ENG3 EXHAUST GAS TEMP IND		3E 301	B13
ENG4 EXHAUST GAS TEMP IND		4E 301	G13
GRP2 FUEL VALVE CONT	4-213	2H 863	E12
GRP4 FUEL VALVE CONT		4H 863	B11
ENG1 N1 RPM IND		1E 151	D19
ENG2 N1 RPM IND		2E 151	C19
ENG3 N1 RPM IND		3E 151	C20
ENG4 N1 RPM IND		4E 151	D20
TANK PRESS IND SUP		D 211	G 3
GRP2 AIR COND VALVE CLOSE AIR GEN IND	5-213	2H 612	A 9
M.W.S. SUP2		W 251	D15
GRP3 AIR COND VALVE CONT IND PRESS IND	15-215	3H 612	A 3
GRP4 AIR COND VALVE CLOSE AIR GEN IND	15-216	4H 612	A24

(3) Remove the quick release fasteners, withdraw panel forwards ; disconnect electrical connectors.

(4) On removed panel, remove dust cover attachment screws ; remove dust cover.

B. Remove (Ref. Fig. 402)

(1) If necessary, release the cable loom ties to facilitate access to terminals ; identify electrical cables.

(2) Disconnect electrical cables from terminals. Use a suitable insertion/extraction tool for pin type connectors.

(3) On forward face of panel, unscrew and remove the switch attachment screw.

(4) Remove locking washer and locating washer.

(5) Remove the test switch.

C. Install

(1) Observe the electrical safety precautions.

(2) Install switch ; position it as indicated on locating washer.

(3) Install locating washer and locking washer.

(4) Screw and tighten attachment nut.

(5) Connect the electrical cables to the switch. For switches equipped with pin type connectors, use a suitable insertion extraction tool. Make certain that the connections are made in accordance with identification labels and corresponding wiring diagrams.

(6) If necessary, secure electrical cables with ties.

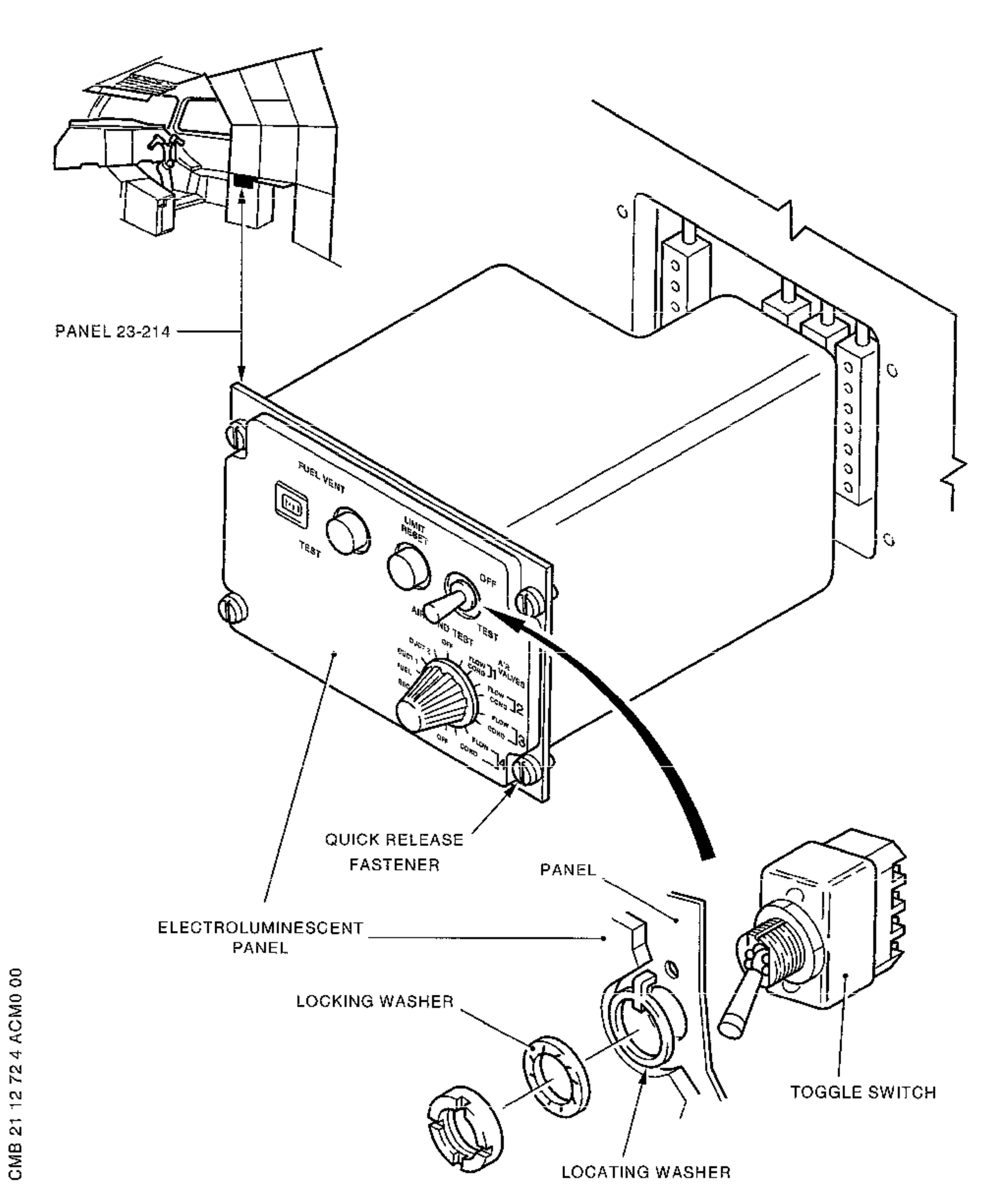
CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(7) Install duct cover at the rear of panel ; screw attaching screws.

(8) Connect electrical connectors to the unit in accordance with connector identifications.

(9) Insert the panel into the structure, lock quick release fasteners.

CAUTION : WHEN INSERTING THE PANEL, MAKE CERTAIN THAT CABLES ARE NOT TRAPPED OR DISTORDED.



Test Switch H647 Removal/Installation
Figure 402

EFFECTIVITY: ALL

R BA

D. Test

Cancel the electrical safety precautions and check the operation of rotary test switch by carrying out the appropriate test procedures.

CHANGEOVER RELAY - ADJUSTMENT/TEST

1. General

The purpose of this test is to check operation of relays H1905 and H1906 supplying power to 1H and 2H bars when power supply to bars 1P or 2P is cut out.

2. Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	

B. Prepare

(1) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP3 BUS NORM SUP	15-215	H1900	G 3
GRP3 BUS STBY SUP	1-213	H1901	F12
GRP4 BUS NORM SUP	15-216	H1902	F23
GRP4 BUS STBY SUP	5-213	H1903	B10

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

C. Test

On TEMPERATURE CONTROL panel 2-214, check that flags of the four CAU IN and DUCT magnetic indicators have disappeared.

- Trip circuit breaker H1900. Check that flag does not appear on group 3 CAU IN-DUCT magnetic indicator.
- Reset circuit breaker H1900
- Trip circuit breaker H1901 ; check that flag does not appear on group 3 CAU IN-DUCT magnetic indicator

- Reset circuit breaker H1901
- Trip circuit breaker H1902 ; check that flag does not appear on group 4 CAU IN-DUCT magnetic indicator.
- Reset circuit breaker H1902.
- Trip circuit breaker H1903. Check that flag does not appear on group 4 CAU IN-DUCT magnetic indicator
- Reset circuit breaker H1903.

D. Close-Up

De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

END OF THIS SECTION

NEXT

HEAT EXCHANGER COOLING SYSTEM - DESCRIPTION AND OPERATION

1. General

The primary and secondary air heat exchangers are cooled by ram air.

The fuel heat exchanger is cooled by fuel.

The air heat exchanger cooling air system includes two different
R bleed points :

R - One is inside the engine air intake and is used during high-speed flight.

R - The other, on the nacelle side, is used at speeds below Mach 0.6. Changeover is effected by an automatic flap.

Ram air flows from the heat exchanger outlet, to the silencer area (hot area) through ducts.

Ejectors are mounted in the outlet ducts and are supplied with air through their control valves. These ejectors generate a negative pressure aft of the heat exchangers. This negative pressure increases fresh air speed in the heat exchangers.
The air supplying the ejectors is bled from the duct between the air conditioning valve and the mass flow control valve and is routed to the ejector control valve via a stainless steel duct in which a restrictor is mounted immediately after the bleed point. In case of a break in the pipe between the bleed point and the ejector control valve, the restrictor will limit the leak flow to a value corresponding to the valve flow in full opening position.

The primary heat exchanger ram air control valve is installed in the primary heat exchanger cooling air duct.
This valve regulates the cooling air flow through the heat exchanger. A fire flap is installed in the cooling air duct.

The fuel heat exchanger is cooled by the aircraft fuel.
The fuel flow in the heat exchanger is controlled by a fuel control valve. This valve is controlled by the MCU electronic unit.

2. Ejector Control Valve

R Four ejector control valves (1H882 to 4H882) are installed on
R aircraft.

A. Description (Ref. Fig. 001)

The valve assembly consists of the following components :

(1) A valve body.

(2) A housing

The housing is provided with a bore guiding the piston rod ; channels provided with restrictors allow restriction of the air. A seal is located between the valve body and the valve head.

(3) A piston

The piston assembly consists of the stem and the valve head. A return spring is installed aft of the valve head.

(4) A feedback lever

A feedback lever actuates the microswitches transmitting the valve position signals.

(5) The solenoid assembly consists of a pintle valve actuated by a solenoid.

B. Operation (Ref. Fig. 001)

(1) Controls

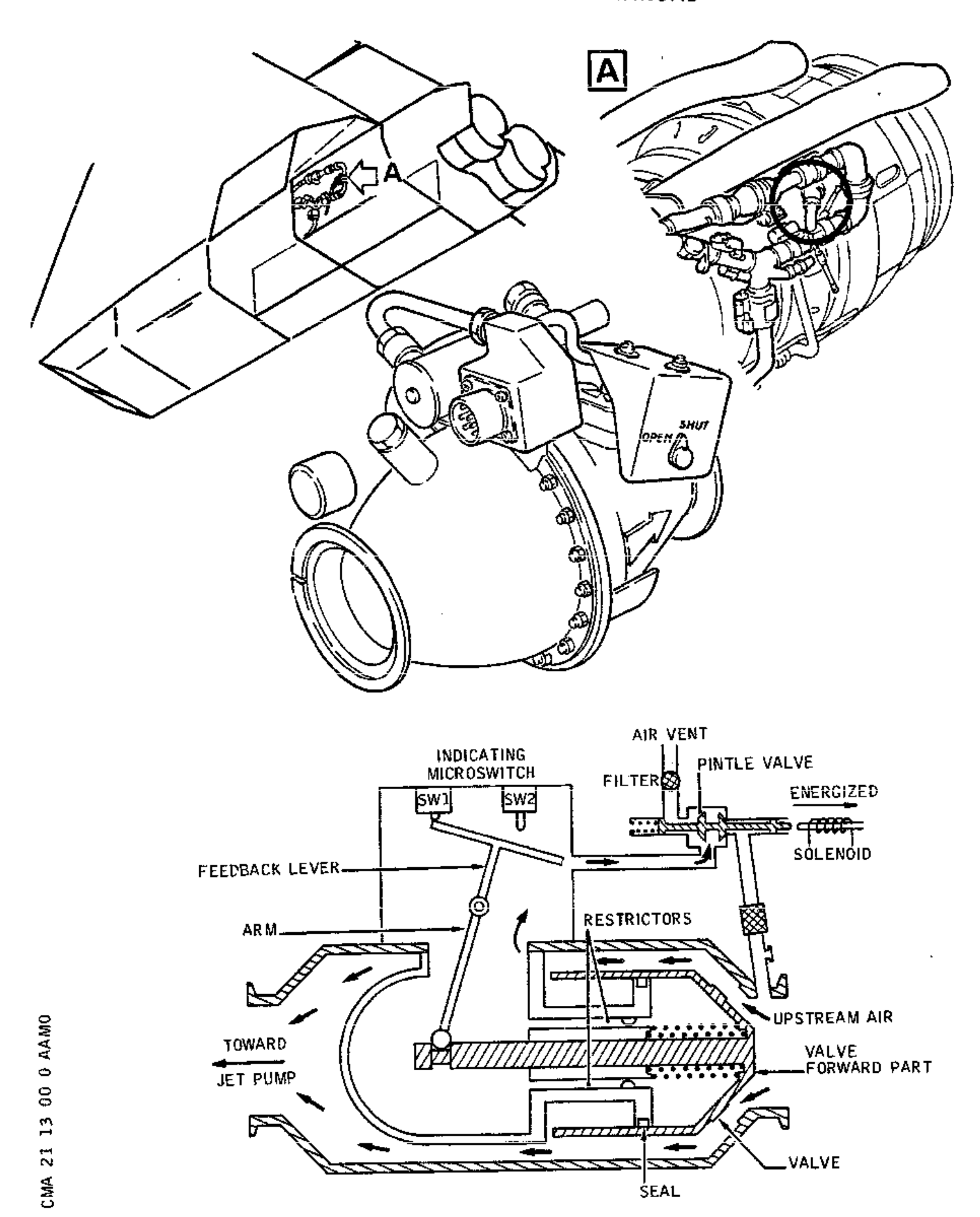
The valve is controlled by air, in accordance with a signal fed to the solenoid when landing gear is downlocked.

(2) Valve closing

When the solenoid is de-energized, the air vent pipe is closed.
P1 pressure is equal to P2 pressure.
The pressure on each side of the valve head is thus equalized. Spring pressure holds the valve closed.
The feedback lever activates the microswitch to indicate valve closed.
On the valve a visual indicator indicates the valve position.

(3) Valve opening

The solenoid is energized.
The air vent pipe is open. P2 pressure decreases.
P1 pressure is sufficient to exceed the spring force and the valve opens. The feedback lever activates the



Ejector Control Valve
Figure 001

microswitch to indicate valve open.
On the valve, a visual indicator indicates the valve position.

R 3. Fuel Control Valve
R (Ref. Fig.002 and 003)

R Four fuel control valves (1H887 to 4H887) are installed in
R aircraft.

A. Description

R (1) Valve canister

The canister is connected into the fuel line to form an isolating chamber for the valve. Canister and valve are concentric cylinders containing a hollow spherical sleeve and plug which rotate between spring-loaded annular seats in opposed ports. The canister sleeve blanks off the fuel line when the valve is not fitted ; the plug bore registers with the ports for fuel flow. The mounting flange has locking thread inserts for attachment bolts and carries an O-ring, as a butt seal. Two end connections are recessed for Gamah coupling flanges and have locking thread inserts for the securing bolts. Three clamps secure the valve. Opposed slots in the sleeve wall form a key which is engaged by the ends of the valve for rotation of the valve.

R (2) Motorised valve

This consists of the valve coupled to the rotary actuator by a mounting adapter.

R (3) Rotary actuator

The actuator is a single-phase a.c. motor with capacitor start, reduction gearing and torque-limiter clutch. Two mechanically-operated switches controlling motor operation and for the operation of an indicator are connected to a 6-pin receptacle.

R (4) Valve

The body has spherical ends which register with the canister seats, and a circular flange with an O-ring to seal the opening of the canister. The flange has clearance slots and locating recesses for the canister clamps ; a drain plug allows air into the canister during removal of the valve. Nuts secure the adapter for the actuator which turns the spindle to rotate the

plug.

B. Operation

(1) Motor circuit

R The motor alternative current is fed through pins A and C to open the valve, and through pins B and C to close it. During motor operation, switch contacts 3-4 or 7-8 close in preparation for the next selection or open to stop the motor. To ensure quick response to varying demands of fuel flow the limit switches are set to provide 50 degree rotation of the plug between shut-off and full bore flow.

(2) Indicator circuit

The circuit shown in the figure provides indication of valve OPEN and valve SHUT positions on a magnetic
R indicator which is connected to a 28 VDC supply. The circuit is completed through pins E and F by
R switch contacts 3-4 (valve closed) or through pins
R D and F by contacts 3-4 (valve open). In the event of actuator failure the override knurled knob is pulled outwards to its full extent and moved to the OPEN position. The knob is then rotated to engage in a vertical slot to lock.

R 4. <u>Master Control Unit 1H868 (MCU)</u>
R (Ref. Fig.004 and 005)

R Four master control units (1H868 to 4H868) are installed on
R aircraft.

A. Description

The master control unit is connected in the circuit of an
R aircraft air conditioning system and is the means of controlling all electrical requirements for the operation of the following air conditioning subsystems :

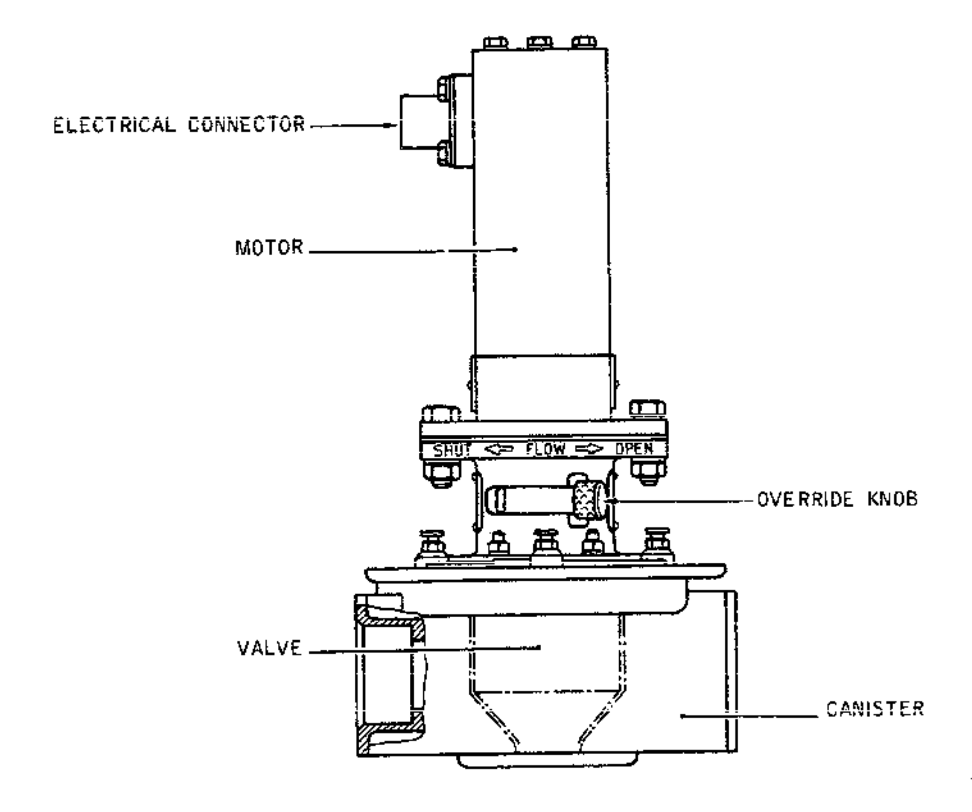
(1) Air mass flow rate and display.

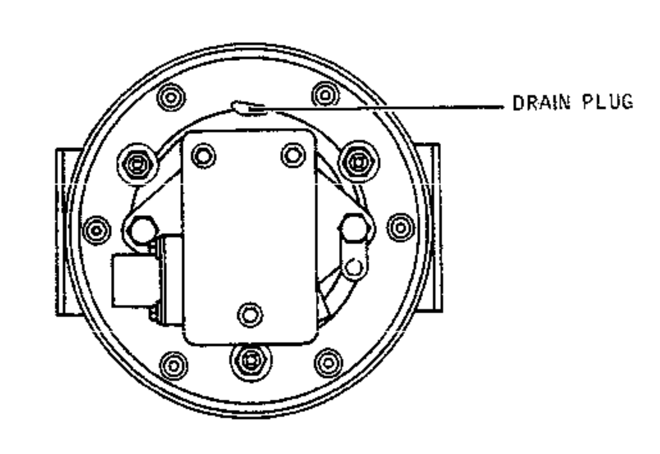
(2) Control of the fuel flow through the fuel heat exchanger relative to the heat exchanger fuel inlet, air inlet and air outlet temperature.

(3) Control of the water extractor relief valve assembly
R relative to the aircraft altitude.

The MCU basically consists of four printed circuit

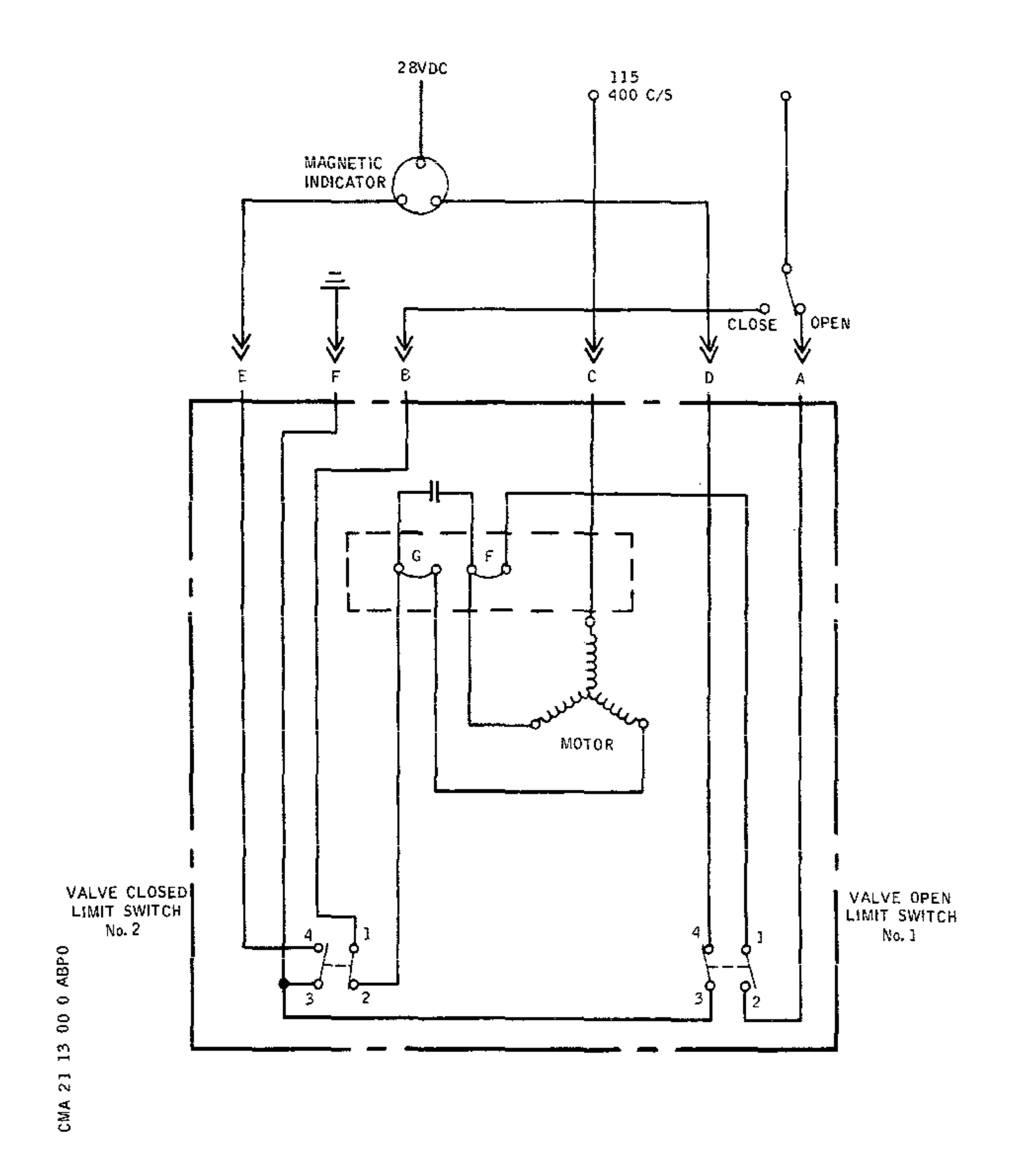
Printed in England





CMA 21 13 00 0 ABMO

Fuel Control Valve
Figure 002



Valve Control and Monitoring Diagram
Figure 003

cards, on which the main components are mounted, and three smaller sub-assemblies all contained in an aluminium case finished in matt black. Each printed circuit card locates into a guide and plugs into a separate edge-connector. Polarizing keys, fitted to each edge-connector, mate with a corresponding key-way on the associated printed circuit card thus preventing location of a card into an incorrect position.

R The case has a removable top cover, allowing access for the removal of printed circuit cards, and a bottom cover, which when removed exposes part of the main cableform, wiring and the choke and filter sub-assemblies.

Electrical connection to the master control unit is made by means of a multipin (PL1) which is located on the lower portion of the back panel. A test socket (SK1) which provides a facility for in-situ testing, a carrying handle and a hold-down hook for installation purposes are mounted on the front panel.

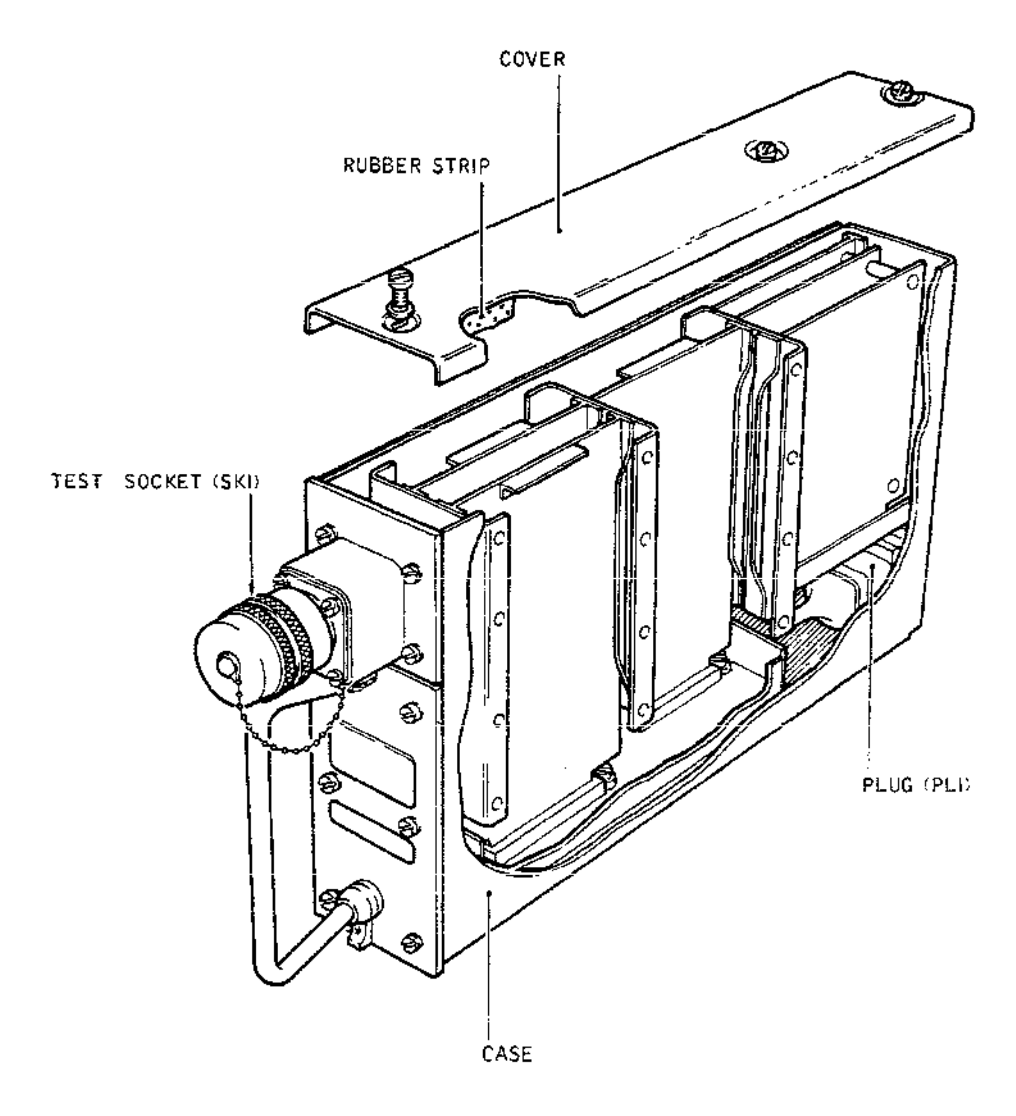
B. MCU Power Supply Card (Ref. Fig. 006)

The power supply module provides the following operating voltages from an aircraft supply of 115V, 400 Hz.

+ve	20.0±	2.5 VDC	+ve	10.0±	1.0 VDC
+ve	15.0±	1.8 VDC	-ve	10.0±	1.0 VDC
-ve	15.0±	1.5 VDC		65.0±	0.05VDC

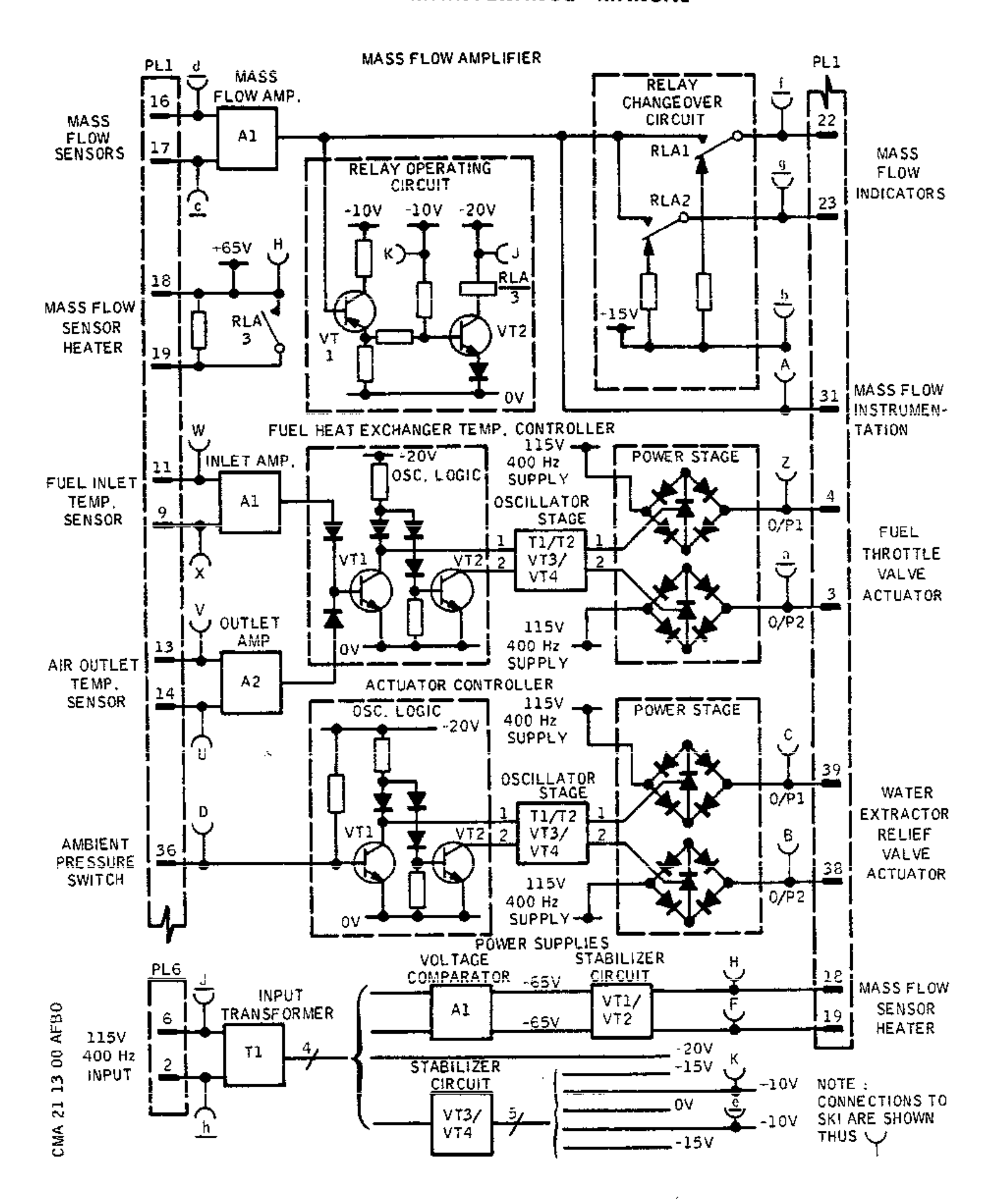
The isolated 65 V d.c. supply is stabilized and provides a constant power source for operation of the air conditioning system mass flow sensor. The supply is derived from secondary windings 5 and 6 of transformer T1. Secondary winding 5 provides the basic power source ; secondary winding 6. (after rectification and smoothing) provides the reference voltage and positive supply for the operation of integrated amplifier A1 which is arranged to function as a d.c. voltage comparator. The output voltage of secondary winding 5 is rectified by diodes MR1 to MR4 and smoothed by capacitors C1, C8, C9 and C10 with R23 and R24 limiting the voltages across the smoothing capacitors to within the working voltage requirements. Zenor diode MR5 limits any voltage transient spikes.

The voltage applied to the inverting input (pin 2) of amplifier A1 is maintained at approximately 9.0 V by diode MR10 to provide the fixed comparator reference



CMA 21 13 00 0 AFMO

Master Control Unit
Figure 004



MCU - Schematic Diagram
Figure 005

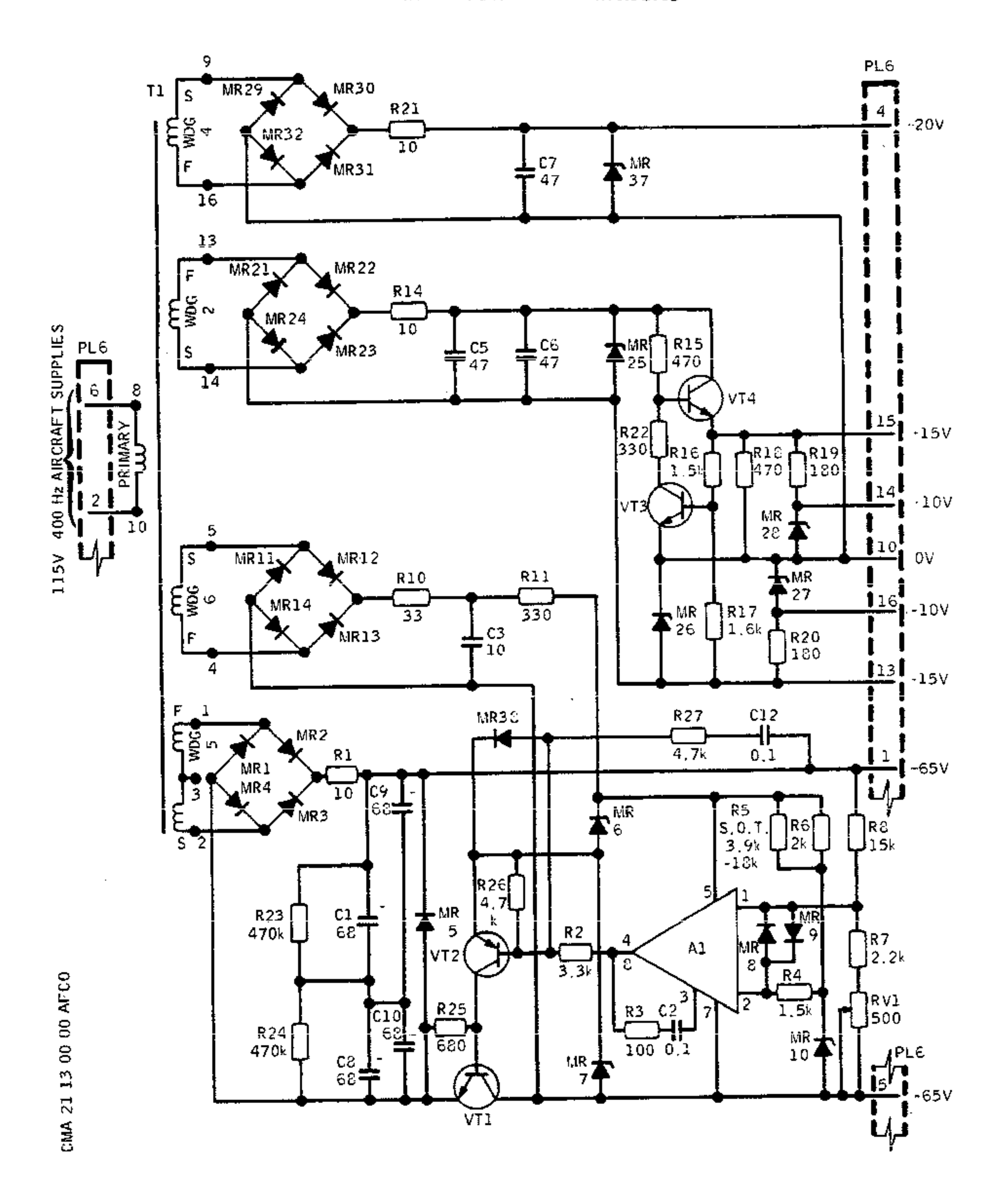
voltage against which the input voltage of the amplifier, derived from divider network R7, R8 and RV1, is compared. A change in the voltage applied to the non-inverting input of amplifier A1 (pin 1) causes the resultant output to swing either positive or negative depending upon whether the non-inverting input voltage is greater or less than the fixed reference voltage. The output of amplifier A1 controls the current through transistor VT2 and hence, series regulator VT1, thus regulating the current to the load and maintaining a constant output voltage. Diode MR38 protects transistor VT2 against polarity reversals, MR7 maintains the emitter voltage at approximately 9.0V. Resistors R25, R26, R27 and capacitor C12 provide circuit stabilization ; chokes L6 and L7 and capacitors C6, C7 provide RFI filtering.

The positive and negative regulated supplies of 10 and 15 volts and the positive unregulated 20 volt supply have a common 0V line and provide the required operating voltages for the printed circuit cards. The 10 and 15 volt supplies are derived from transformer T1, secondary winding 2, and the 20 volt supply from secondary winding 4.

C. Mass Flow Amplifier Card (Ref. Fig. 007)

The mass flow amplifier converts the output from the air conditioning system mass flow sensor into a signal of sufficient amplitude to operate the air conditioning system mass flow indicators. Relay protection circuits are incorporated to prevent overheating of the mass flow sensor heating element and to limit deflection of the mass flow indicator pointers when no air flow is present.

The air conditioning system mass flow sensor and the input circuit of the amplifier form a resistance bridge network which applies the temperature differential, derived from the mass flow sensing elements and proportional to specific air mass flow, for amplification by the integrated amplifier A1. Amplifier A1 also functions as a triggering device to energize relay RLA through the operation of transistor switches, VT1 and VT2.
During initial system operation of the mass flow amplifier, transistor VT2 is switched on by the application of the positive 10 and 20V (printed circuit board) supplies, with VT1 remaining non-conducting. As VT2 switches on, relay RLA is energized, the amplifier output is then routed via RLA1 and RLA2 contacts to provide mass flow indication. The full 65V power supply derived voltage (i.e. resistor R2 not in circuit) via RLA3 provides the constant power required for the mass flow sensor heater. With the bridge



MCU Power Supplies
Figure 006

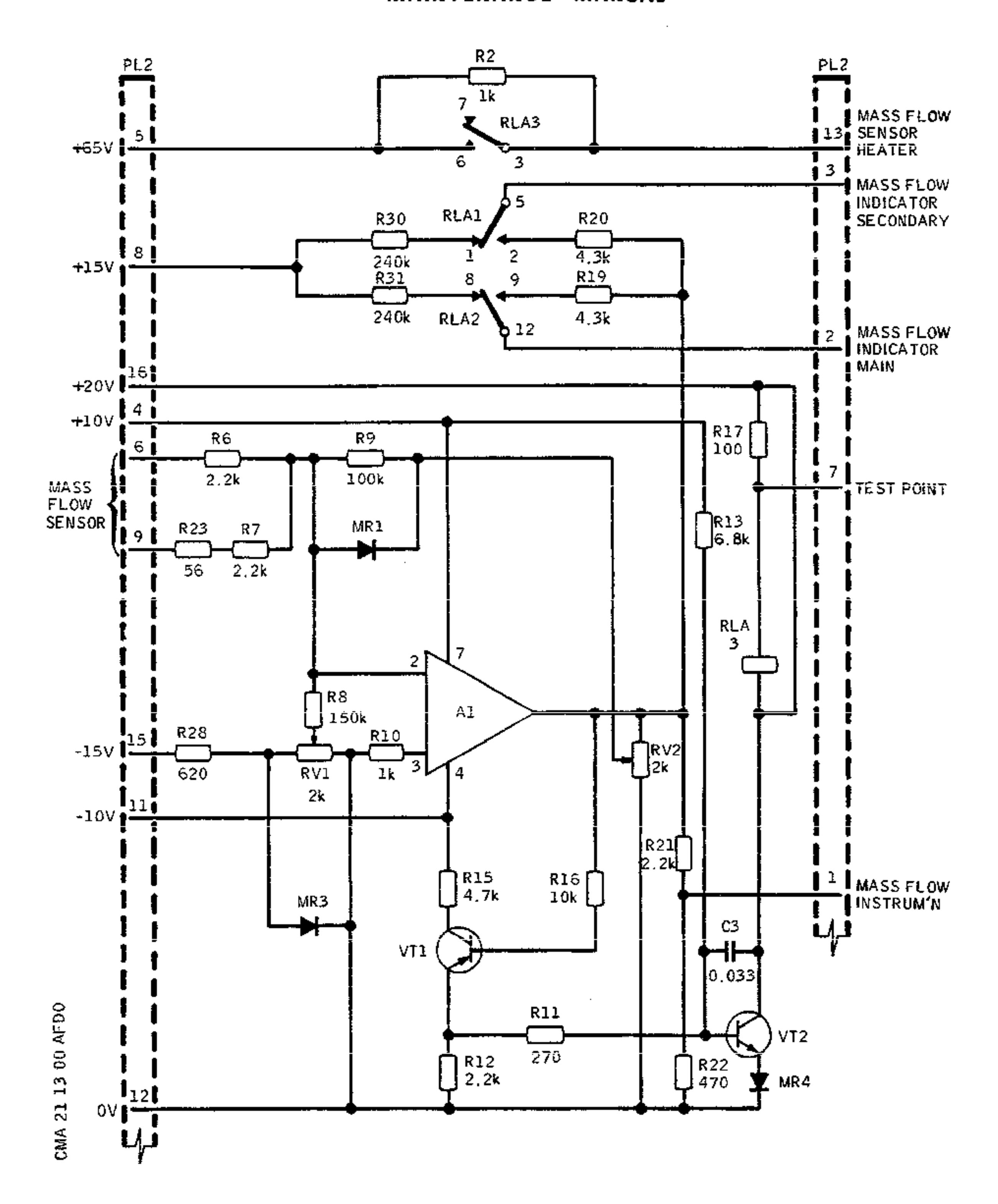
R

input circuit conditions such that the output of amplifier A1 falls to a 0V level and swings sufficiently negative to switch on VT1, VT2 then cuts-off and relay RLA is de-energized. Relay contacts RLA-1 and RLA-2 isolate the mass flow indicators from the output of the mass flow amplifier and through resistors R30 and R31 supply a nominal current to maintain each mass flow indicator point in a zero position. Relay contact RLA-3 connects resistor R2 in circuit thus limiting the mass flow sensor heating element current to provide protection against overheat and initial surge.

D. Fuel Heat Exchanger Temperature Controller (Ref. Fig. 008)

The fuel heat exchanger controller controls the flow of fuel through the air conditioning system fuel heat exchanger. When the temperature of the heat exchanger inlet air is greater than that of the inlet fuel, the fuel control valve opens and fuel flows through the heat exchanger. When the inlet air temperature is lower than the inlet fuel temperature, the fuel throttle valve is closed the heat exchanger is by-passed and the fuel flow is diverted through a by-pass valve. When the air temperature at the heat exchanger outlet falls below a specified level owing to excessively low fuel temperatures, the fuel throttle valve is closed and fuel is caused to by-pass the heat exchanger. The inlet amplifier compares temperature proportional voltages received from the system heat exchanger air and fuel inlet temperature sensors and produces a resultant two-state (ON/OFF) output voltage. The logic state has two outputs (1 and 2) of which 1 is ON when 2 is OFF and conversely 1 is OFF when 2 is ON, dependent on the state of the inlet or outlet amplifier output. The oscillator stage has two outputs (1 and 2) controlled respectively by logic outputs 1 and 2. When either oscillator is on the other is inhibited. The oscillator output is rectified before being fed to the power stage which comprises two switching circuits that route a common 115V, 400 Hz, supply to either O/P1 or O/P2 dependent on the relative states of the oscillator outputs.

When the inlet air temperature at the heat exchanger exceeds that of the inlet fuel, the inlet amplifier output is OFF, logic output is ON, oscillator output 1 is ON and the power stage routes the 115V supply to O/P1 thus driving the fuel control valve to the open position. When the inlet air temperature is lower than that of the inlet fuel, the inlet amplifier output is ON, logic output 2 is ON, oscillator output 2 is ON and the power stage routes the 115V supply to O/P2 thus driving the fuel control valve to the closed position. In the event of the air



MCU Mass Flow Amplifier Card
Figure 007

temperature at the heat exchanger outlet falling to a level when, owing to excessively low temperatures, icing of the heat exchanger would occur, the outlet amplifier produces an override voltage which switches logic output 2 ON thus closing the fuel control valve.

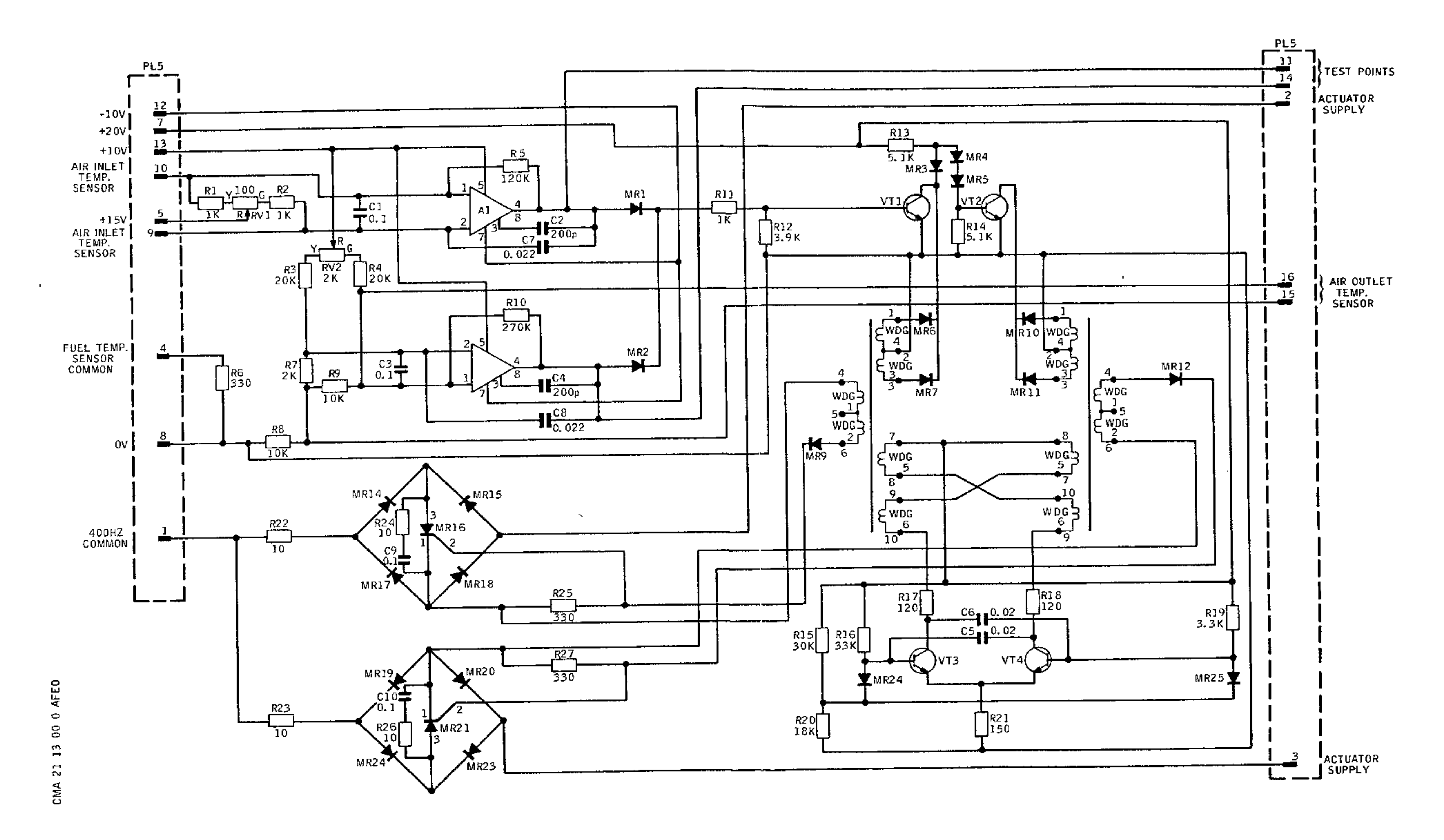
With the application of the relevant power supplies the oscillator circuit is self-starting and an output of 115V from either terminal 2 or 3, dependent on circuit conditions, is instantaneous. The self regulating circuit comprising transistors VT3 and VT4, with their associated components, providing an output frequency of approximately 5 kHz which is coupled to primary windings 5 and 6 of transformers T1 and T2. Current flowing in the primary windings induces a voltage output in the secondary windings of a polarity dependent on the rate of change of primary current. The rectified output of secondary windings 1 and 2 provides a gate trigger for operation of silicon controlled rectifier MR16 or MR21.

The logic circuits which control the output of transformers T1 and T2 consisting of VT1, VT2 and their associated components, are operated by the bias conditions applied from the output of the inlet amplifier, or if an override signal is present the output of the outlet amplifier, to the base of VT1. Transistor VT1 is therefore either conducting and VT2 cut-off, or VT1 cut-off and VT2 conducting according to the output of amplifier A1 and A2. The fuel inlet and air inlet sensors during system operation are connected across the differential inputs of A1 so that the resultant changes in sensor resistances, occurring from temperature changes, cause a corresponding change in the potential difference applied to A1 inputs. When A1 output rises sufficiently positive causing VT1 to switch on, VT2 which is normally conducting is cut-off. Secondary windings 3 and 4 of T1 are connected through VT1 to the OV line thus inhibiting the output of T1 windings 1 and 2. Conversely the output of T2 is not inhibited since VT2 is switched off. The gate of MR21 is triggered by the rectified output of T2, windings 1 and 2, causing MR21 to conduct (until the fuel throttle valve limit switch is operated) and route the 115V supply to terminal 3. The 115V supply reverts to terminal 2 when amplifier A1 output falls, VT1 is cut-off, VT2 switched on and MR16 conducting.

E. Actuator Controller Card (Ref. Fig. 009)

The actuator controller controls the air conditioning system water extractor relief/by-pass valve by means of a signal received from an ambient pressure switch, so that

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MCU - The Temperature Controller
Figure 008

R

the water extractor relief/by-pass valve assembly is positioned where the relief/valve is in circuit below an altitude of 31,000 ft and withdrawn from circuit to provide a by-pass at altitude above 31,000 ft.

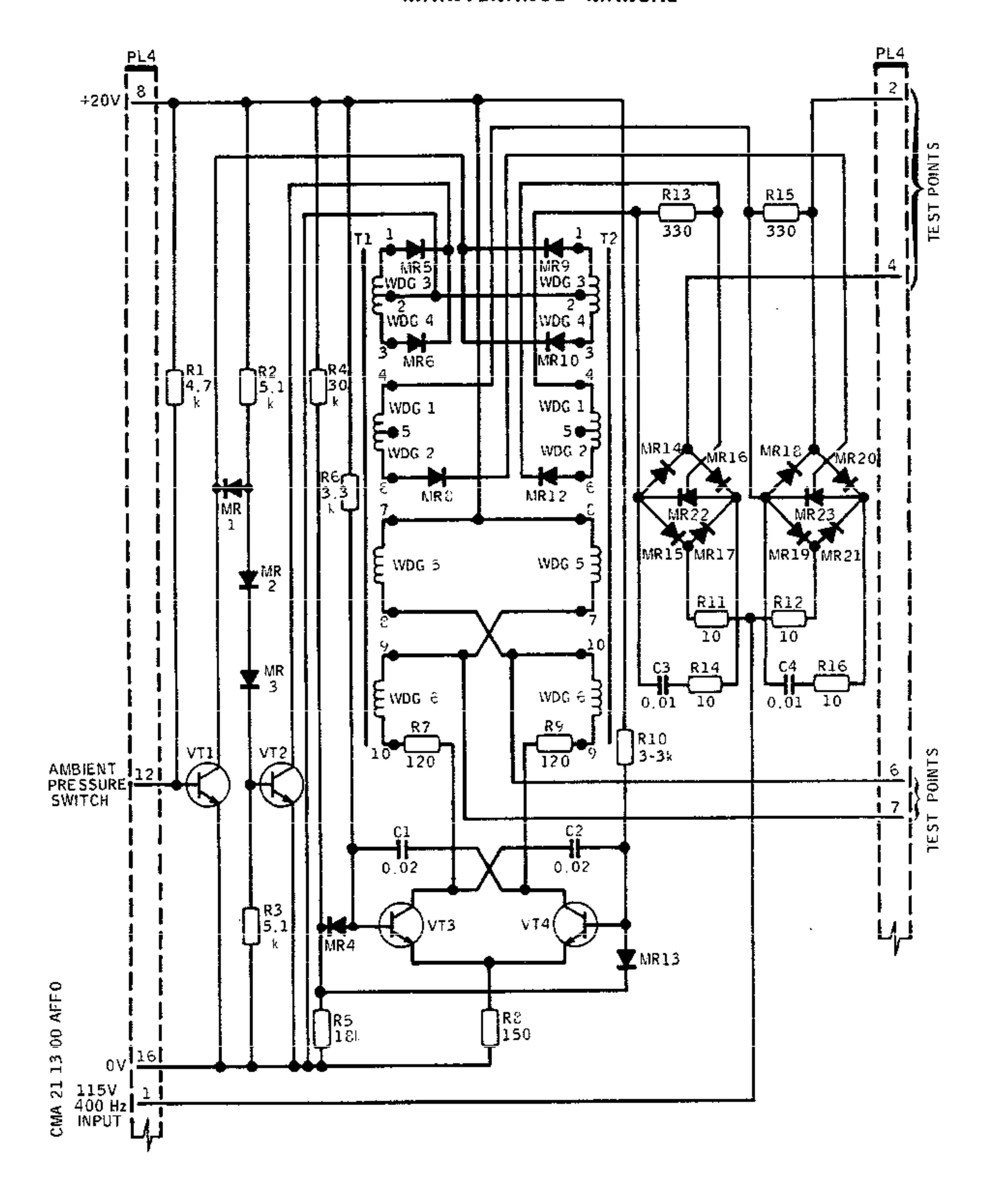
The logic, oscillator and power stages are similar to those described in Para. C. Below approximately 31,000 ft. logic output 1 is ON, oscillator output 1 is ON and the 115V, 400 Hz supply is routed to O/P 1 and the automatic operation of the ambient pressure switch causes the water extractor relief/by-pass valve assembly to be driven into the 'in circuit' position. Above 31,000 ft the logic output 2 is ON, oscillator output 2 is ON and 115V supply routed to O/P 2 thus driving the water extractor relief/by-pass valve assembly to the 'by-pass' position.

Operation of the oscillator circuit, transformers T1 and T2 and the power switching circuit is also similar to that described in Para. C. The logic circuit comprising of VT1, VT2, resistors R1, R2, R3 and diodes MR1, MR2 and MR3 control the outputs of T1 and T2 and determines whether the 115V supply is routed to terminal 2 or 4. The input conditions applied to the base of VT1, terminal 12, controls the switching states of both transistors. Initially with no external input applied to its base VT1 is switched on, deriving its operating voltages from the 20V line through load resistor R2, diode MR1 and bias resistor R1, and VT2 is cut-off. Transformer T2 windings 3 and 4 are connected through VT1 to the OV line and the output of windings 1 and 2 inhibited. The output of T1, windings 1 and 2, is rectified by MR8 and applied as a trigger voltage to the gate of MR23 causing it to conduct and route the 115V supply to terminal 2. MR23 reverts to a non-conducting state when the water extractor actuator limit switch opens and the anodecathode current of MR23 falls to a value below the holding current.

When the ambient pressure switch is in circuit, taking VT1 base to the OV line, VT1 is switched off, MR1 becomes reverse biased as VT1 collector voltage rises, VT2 is switched on and the output of T1 windings 1 and 2 is inhibited. Since T2 output is no longer inhibited, the rectified output of MR12 triggers the gate of MR22 which conducts (until the water extractor actuator limit switch operates) and the 115V supply is thus routed from terminal 2 to terminal 4.

R 5. <u>Fuel Heat Exchanger Inlet Fuel Temperature Sensor (FTS)</u> (Ref. Fig. 010)

R Four fuel heat exchanger inlet fuel temperature sensors (1H888



MCU Actuator Controller
Figure 009

R

R to 4H888) are installed on aircraft.

Description

The fuel temperature sensor (FTS) is fitted to an inlet pipe on a fuel heat exchanger used in an aircraft's air conditioning system.

The FTS consists of a platinum sensing element bonded into a copper block which is mounted in a fibreglass block. The wires from the sensing element are routed through the fibreglass block. The wires from the sensing element are routed through the fibreglass block to contacts in a receptacle, which together with a receptacle housing is secured to the block by four screws.

The FTS is mounted in thermal contact with the fuel inlet pipe so that a change in fuel temperature causes a corresponding change in the resistance value of the sensing element, by an amount proportional to the fuel temperature change.

Temperature	Resistance
0°C	100.0 ± 0.24 ohms
20°C	107.89 ± 0.24 ohms
40°C	115.74 ± 0.24 ohms
60°C	123.54 ± 0.24 ohms

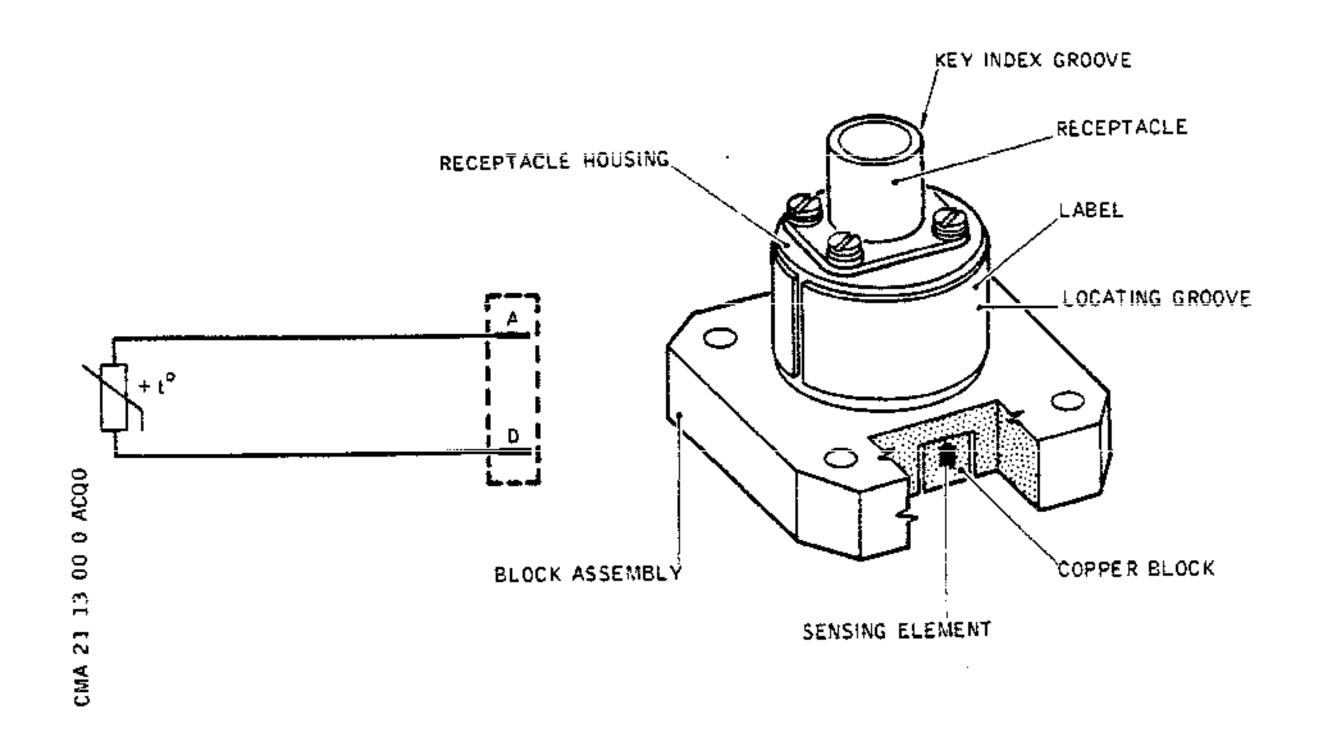
R 6. Fuel Heat Exchanger Air Inlet Temperature Sensor (ATS) (Ref. Fig. 011)

R Four fuel heat exchanger air inlet temperature sensors (1H889
R to 4H889) are installed on aircraft.

Description

The air temperature sensor (ATS) is fitted into a fuel heat
R exchanger inlet duct, part of an aircraft air conditioning system, to sense the charge air temperature.

The ATS consists of a platinum resistance sensing element enclosed within a slotted fibreglass mounting tube which protrudes through an aluminium alloy mounting plate. The leads from the sensing element are joined inside the mounting tube and the wiring connected to contacts in a receptacle. The receptacle and a receptacle housing are secured to the mounting plate by four screws. The receptacle housing is partially filled with silicone rubber which encapsulates the

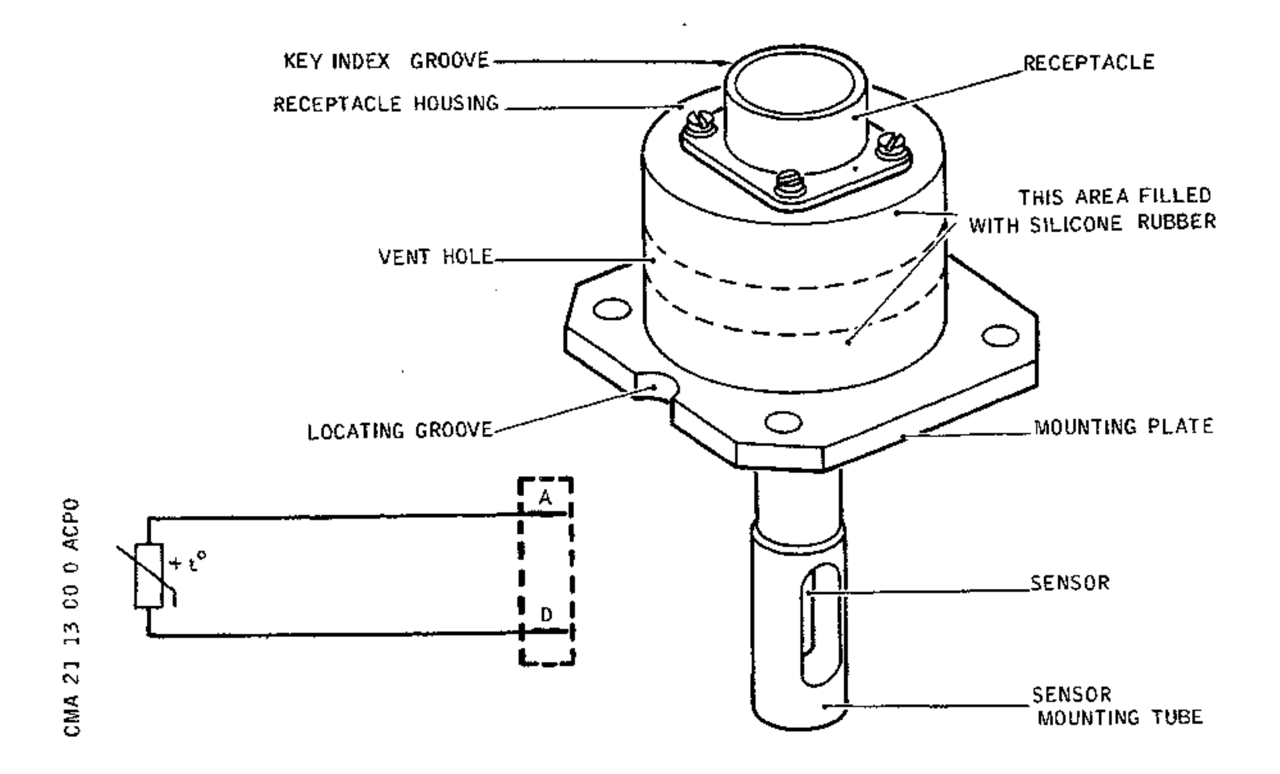


R Fuel Heat Exchanger Inlet Temperature Sensor
Figure 010

wires at each end of the receptacle housing, leaving an air space in the middle which is vented by means of a small hole.

The fibreglass mounting tube protrudes into the duct air flow so that the temperature of air passing through the slot in the mounting tube is sensed by the sensing element. A change in duct air temperature causes a corresponding change in the resistance value of the sensing element by an amount proportional to the air temperature change.

Temperature	Resistance
0°C	100.0 ± 0.24 ohms
20°C	107.89 ± 0.24 ohms
40°C	115.74 ± 0.24 ohms
60°C	123.54 ± 0.24 ohms



Fuel Heat Exchanger Air Inlet Temperature Sensor
Figure 011

R 7. Fuel Heat Exchanger Air Outlet Temperature Sensor (DTS) (Ref. Fig. 012)

R Four fuel heat exchanger air outlet temperature sensors (1H890
R to 4H890) are installed on aircraft.

Description

The duct temperature sensor (DTS) is fitted in an aircraft's air conditioning system to sense the temperature of the air passing through the various ducts.

The DTS assembly consists of a thermistor contained within the end of the fibreglass mounting tube. The thermistor leads are routed through the mounting tube to terminal pins which are connected by wiring to contacts in a receptacle. The receptacle and a receptacle housing are secured to a mounting plate by four screws. The receptacle housing is partially filled with silicone rubber which encapsulates the thermistor lead terminal pins in the lower section of the housing, and

the receptacle contacts in the upper section, leaving an air space in between which is vented by means of a small hole. The fibreglass mounting tube protrudes into the duct air flow so that the temperature of air passing through the slot in the tube end is sensed by the thermistor. A change of air temperature causes a corresponding change in the electrical resistance value of the thermistor.

Temperature	Resistance
0°C	6570 ± 132 ohms
25°C	2000 ± 38.4 ohms
50°C	719.3 ± 10.7 ohms
75°C	296 ± 7.6 ohms

Fuel Heat Exchanger Air Outlet Temperature Sensor
Figure 012

R 8. System Operation

R A. Primary and Secondary Heat Exchanger (Ref. Fig. 013)

(1) At high speed, the cooling air is bled from the engine air intake. For a speed under Mach 0.6, the cooling air is collected by a scoop located on the nacelle air intake side.

A moving flap automatically selects either intake. The difference in speed between the ram air at both air intakes will position this flap.

(2) At low speed, to speed up fresh air circulation in the heat exchangers, ejectors generate a negative pressure aft of the heat exchangers. A valve supplies
R these ejectors.

The valve is electro-pneumatic, and is operated by a solenoid which, when energized, opens the valve. Its operation is related to the landing gear position ; the valve is open when the landing gear is downlocked.
R On Flight Engineer's panel 2.214 a magnetic indicator indicates the valve position.

B. Primary Heat Exchanger Ram Air Control Valve

(1) This valve is air operated. It is controlled by two thermostats.

(a) A thermostat on the cooling air system.

(b) A thermostat at the cold air unit compressor inlet.

(2) When the cooling air temperature is lower than 25°C (77°F) approximately, the system limits the minimum temperature at the compressor inlet to 100°C (212°F) approximately.

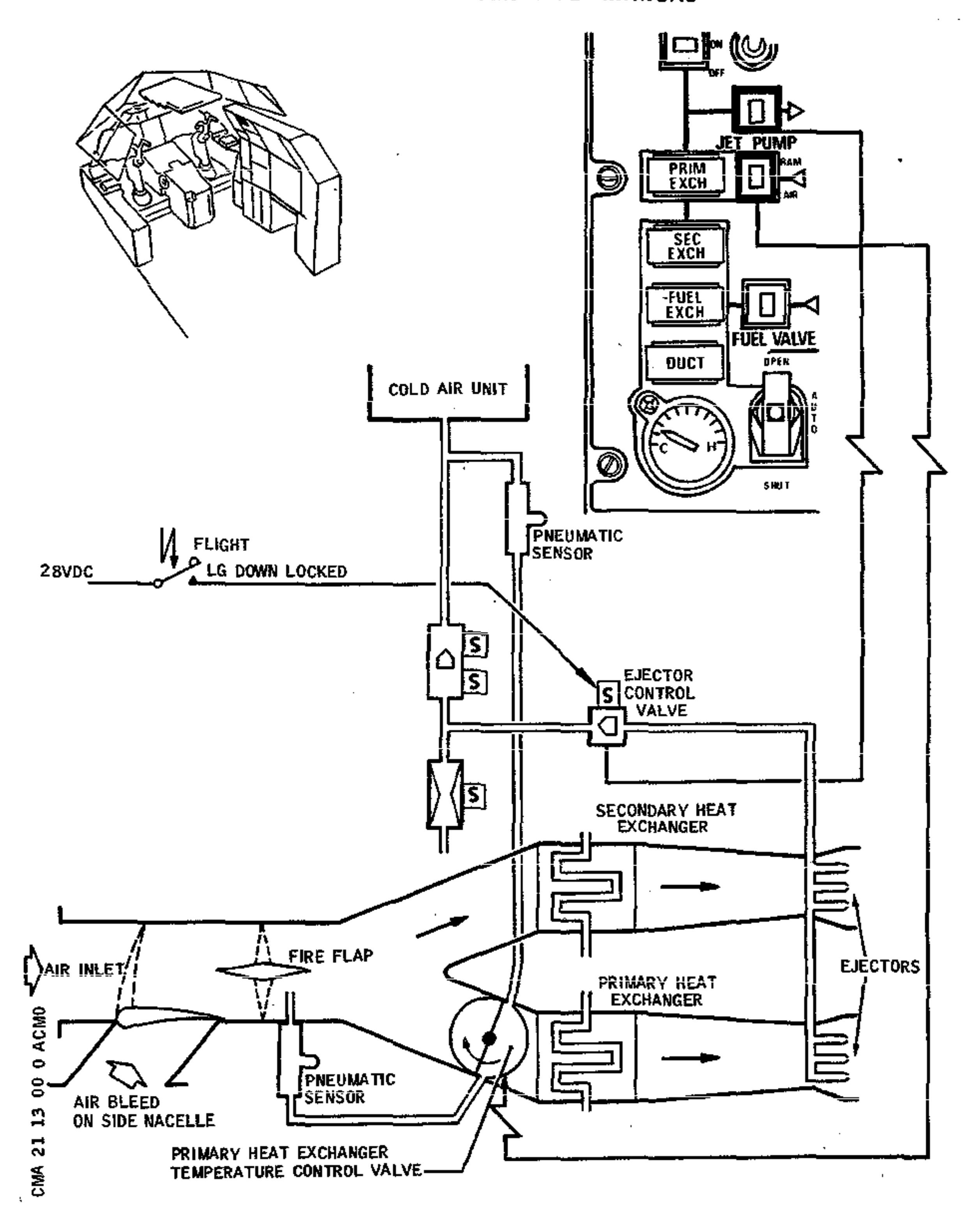
C. Fuel Heat Exchanger (Ref. Fig. 014)

The fuel which cools the heat exchanger is controlled by the fuel control valve which is an electrically-controlled butterfly valve. Normal operation of the valve is automatic through an electronic controller.

(1) Automatic operation

R On Flight Engineer's panel, on AIR BLEED CONTROL panel
R 2.214, FUEL VALVE switch is in AUTO position.
R

The valve automatic operation is obtained by an electronic controller MCU supplied with the temperature signals from the three temperature sensors.



Cooling of Air Heat Exchangers
Figure 013

R

(a) A temperature sensor (ATS) measures the air temperature at the fuel heat exchanger inlet.

(b) A temperature sensor (DTS) measures the air temperature at the fuel heat exchanger outlet.

(c) A temperature sensor (FTS) measures the fuel temperature at the heat exchanger inlet.

The signals from the three sensors are processed in the MCU and the resulting signal is fed to the fuel control valve.

The valve closes when the air temperature at the heat exchanger inlet is lower than the fuel temperature.

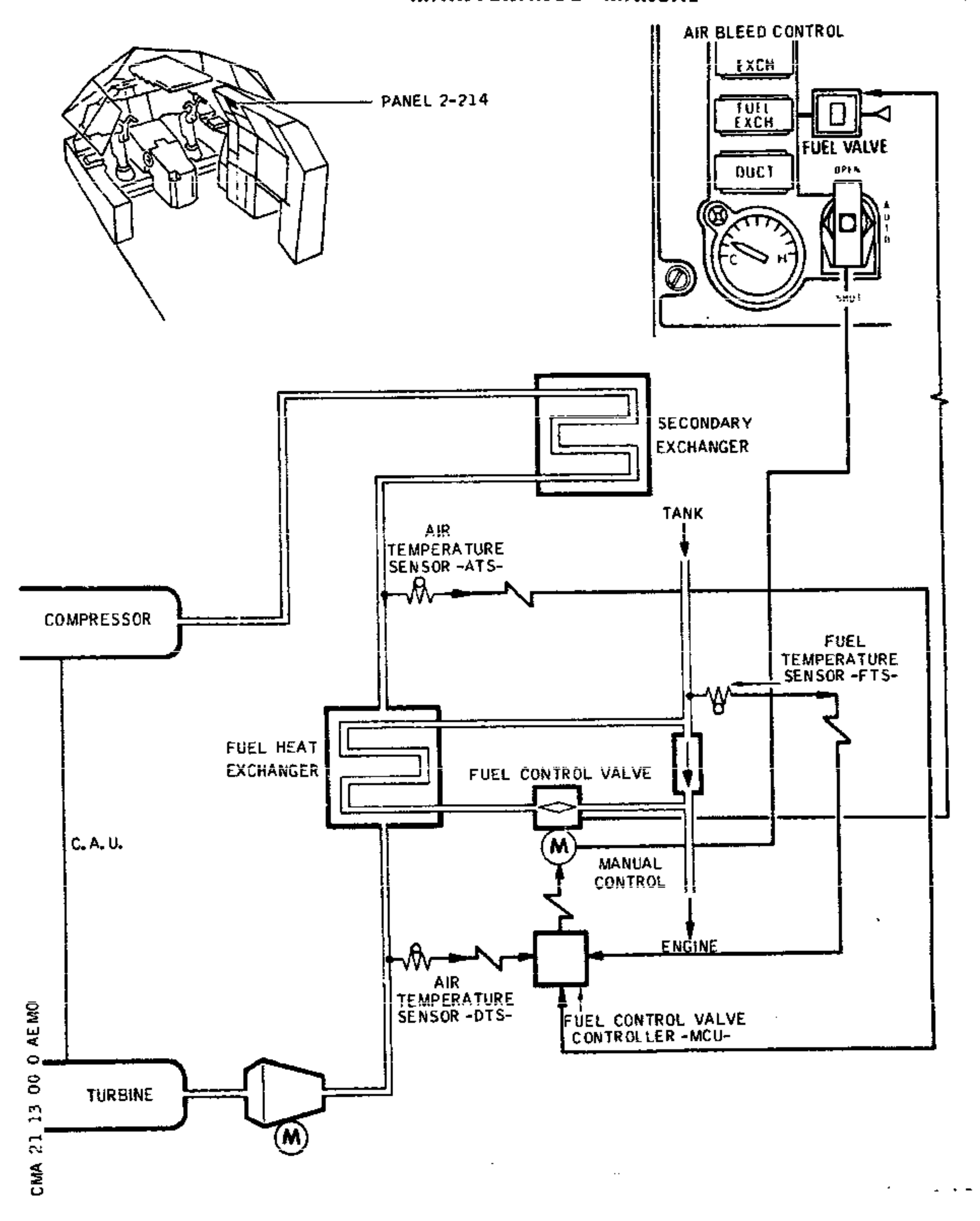
The valve controls the fuel flow in the heat exchanger when the air outlet temperature is 10°C (50°F) or when the air inlet temperature is above the fuel temperature.

The valve is fully open when the air outlet temperature is above 10°C (50°F) and when the air inlet temperature is above the fuel temperature.

On Flight Engineer's panel, on AIR BLEED 2.214, FUEL VALVE magnetic indicator indicates the valve position.

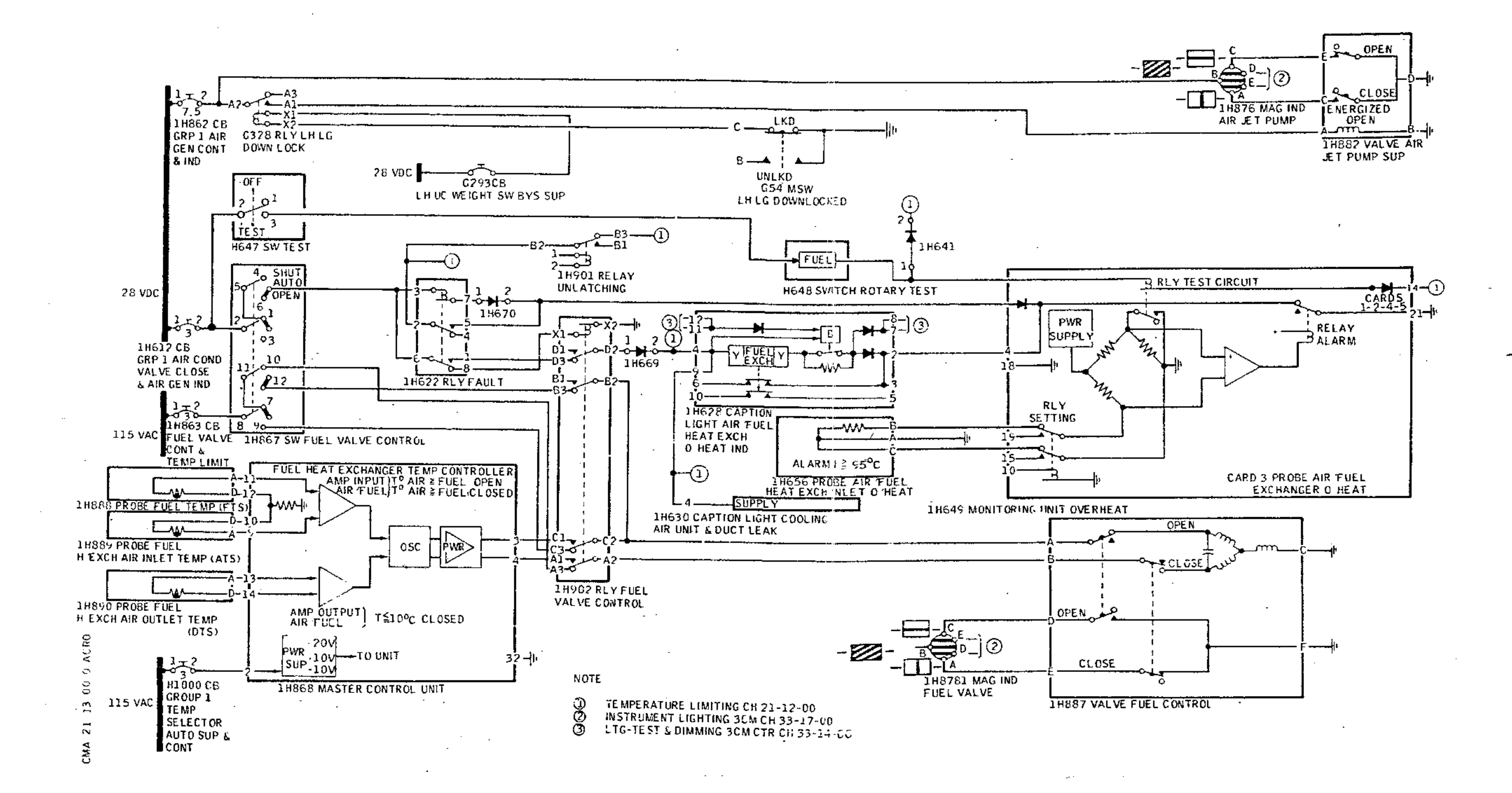
D. Operation of Fuel Control Valve (Ref. Fig. 015)

The heat exchanger cooling system consists of four identical circuits (Groups 1, 2, 3 and 4) ; for this reason only circuit 1 is described. Replace 1 by 2, 3 or 4 to obtain the identifiers of components corresponding to another circuit.
The system is automatically operated by means of the master control unit (MCU) and FUEL VALVE CONTROL switch placed in AUTO position.
The system is manually operated by means of the FUEL VALVE CONTROL switch placed in SHUT or OPEN position. In this case, the MCU operation has no effect.



Cooling of Fuel Heat Exchanger
Figure 014

R



NOTE

1. TEMPERATURE LIMITING CH 21-12-00
2. INSTRUMENT LIGHTING 3CM CH 33-17-00
3. LTG-TEST & DIMMING 3CM CTR CH 33-14-00

Group 1 Heat Exchanger Cooling Block Diagram
Figure 015

R

(1) Fuel control valve automatic opening (Ref. Fig. 016)

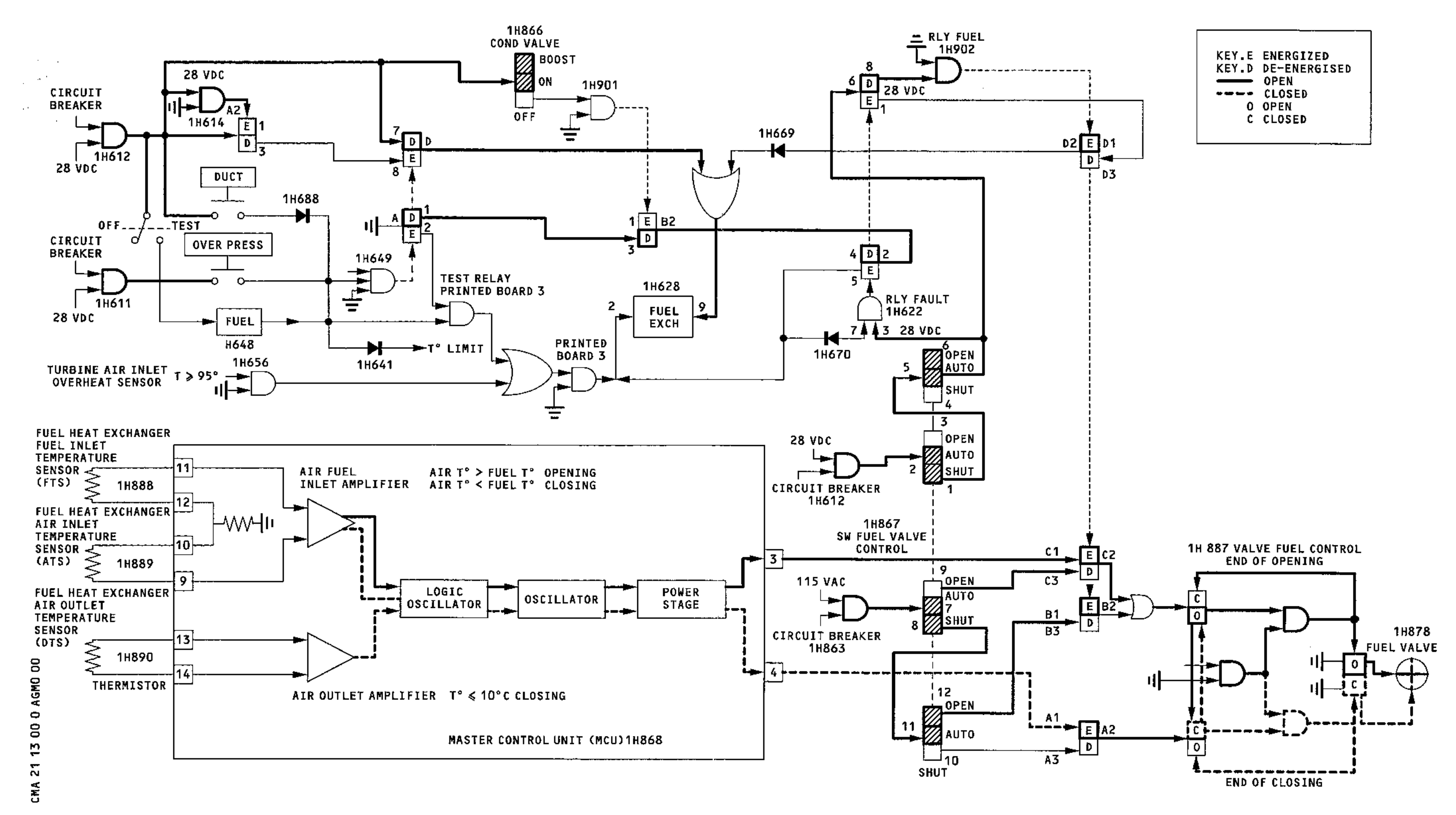
When FUEL CONTROL VALVE switch 1H867 is in AUTO position :

- circuit breaker 1H612 supplies terminal 6 of fault relay 1H622,
- circuit breaker 1H863 supplies terminal B3 of fuel relay 1H902. In the absence of overheat condition detected by sensor 1H656, fault relay 1H622 is de-energized and enables, via terminal 6, energization of fuel relay 1H902.

(a) When the upstream air temperature detected by the fuel heat exchanger air inlet temperature sensor (ATS) 1H889 is higher than the fuel temperature detected by fuel heat exchanger inlet fuel temperature sensor (FTS) 1H888, the master control unit supplies an opening signal.
The signal is applied to terminal C1 and C2 of fuel relay 1H902 on fuel control valve 1H887 ; the valve opens.
Since fuel relay 1H902 is energized, 115 VAC on terminal B3 of this relay cannot be applied to the fuel control valve.
At the end of valve opening :
- the motor microswitches close the closing circuit and are ready to receive a closing signal FUEL VALVE magnetic indicator 1H878 displays a horizontal stripe which indicates that the fuel control valve is open.

(b) When the upstream air temperature detected by the fuel heat exchanger air inlet temperature sensor (ATS) 1H889 is lower than the fuel temperature detected by the fuel heat exchanger inlet fuel or for a dowstream air temperature detected by fuel heat exchanger air outlet tmeperature sensor (DTS) 1H890 lower than 10°C (50°F), the master control unit (MCU) supplies a closing signal.
The closing signal from the MCU is applied to terminals A1 and A2 of fuel relay 1H902 on fuel control valve 1H887 which closes.
Since fuel relay 1H902 is energized, 115 VAC on terminal B3 of this relay cannot be applied to the fuel control valve.
At the end of valve closing,
- the engine microswitches close the opening circuit and are ready to receive an opening signal. FUEL VALVE magnetic indicator displays a vertical stripe which indicates that the fuel control

R valve is closed.

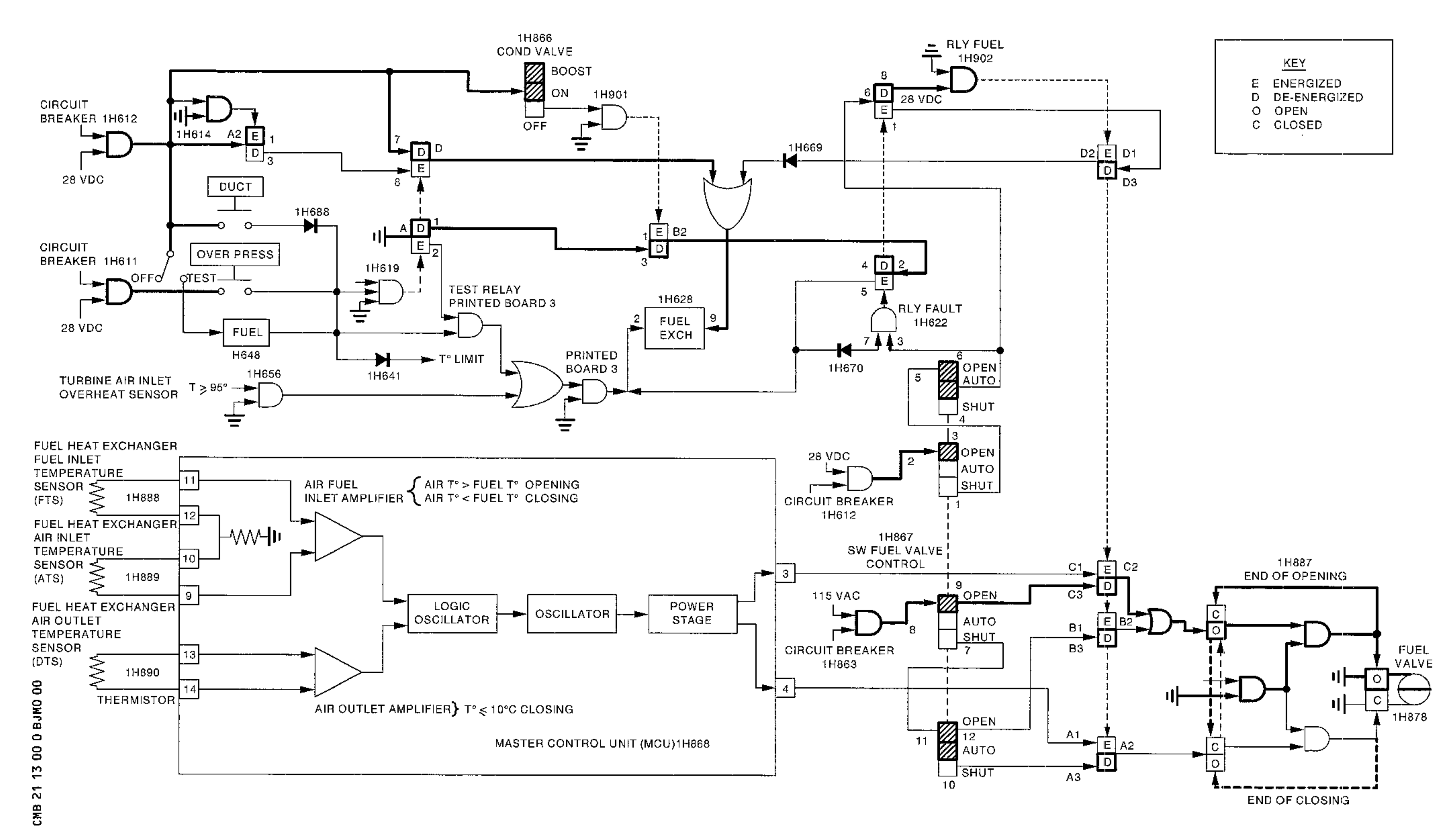


Fuel Control Valve in AUTO position
Figure 016

R (2) Fuel control valve manual opening (Ref. Fig. 017)

R The FUEL VALVE CONTROL switch 1H867 is placed in OPEN
R position.
R The master control unit (MCU) has no effect on fuel
R control valve operation.
R When switch is in OPEN position :
R - circuit breaker 1H612 no longer supplies fuel relay
R 1H902 which moves to the de-energized position,
R - circuit breaker 1H863 applies 115 VAC to terminals
R C3-C2 of de-energized fuel relay 1H902 which supplies
R this voltage to the windings of fuel control valve
R 1H887 which opens.
R At the end of valve opening :
R - the motor microswitches close the closing circuit and
R are ready to receive a closing signal. FUEL VALVE ma-
R gnetic indicator displays a horizontal stripe which
R indicates that the fuel control valve is open.

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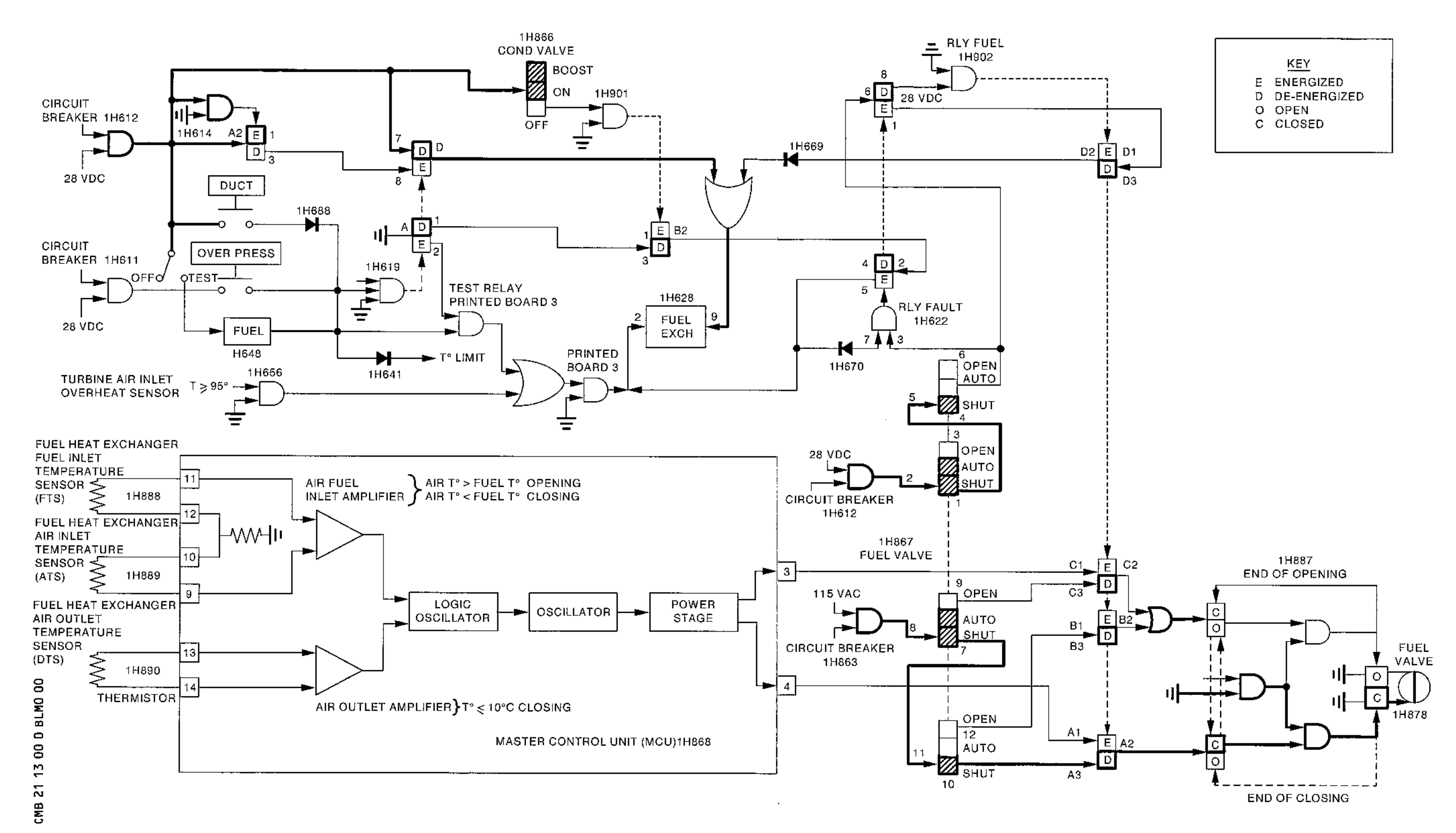


Fuel Control Valve in OPEN Position
Figure 017

R (3) Fuel control valve manual closing (Ref. Fig. 018)

R With FUEL VALVE CONTROL switch 1H867 placed in SHUT po-
R sition :
R - the master control unit has no effect on fuel control
R valve operation,
R - circuit breaker 1H612 no longer supplies fuel relay
R 1H902 which moves to the de-energized position,
R - circuit breaker 1H863 supplies terminals A3-A2 of
R de-energized relay 1H902 with 115 VAC which sends
R this voltage to the windings of fuel control valve
R 1H887 ; the valve closes.
R At the end of valve closing :
R - the motor microswitches move to close the opening
R circuit and are ready to receive an opening signal,
R - the FUEL VALVE magnetic indicator displays a vertical
R stripe which indicates that the fuel control valve is
R closed.

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Fuel Control Valve in SHUT Position
Figure 018

(4) Overheat detection in automatic operation
(Ref. Fig. 019)

When the turbine air inlet overheat sensor 1H656 detects an air overheat temperature equal to or greater than 95°, board 3 of overheat safety box grounds :
- FUEL EXCH caption light 1H628 at terminal 3,
- warning relay 1H622 through diode 1H670.

(a) With FUEL VALVE CONTROL switch 1H867 placed in AUTO position.

(a1) Circuit breaker 1H612 supplies 28 VDC to warning relay 1H622 which moves to the energized position, this enables de-energization of fuel relay 1H902 and consequently transmission of this power to FUEL EXCH caption light which comes on.

(a2) The fuel control valve is no longer supplied by the master control unit (MCU).

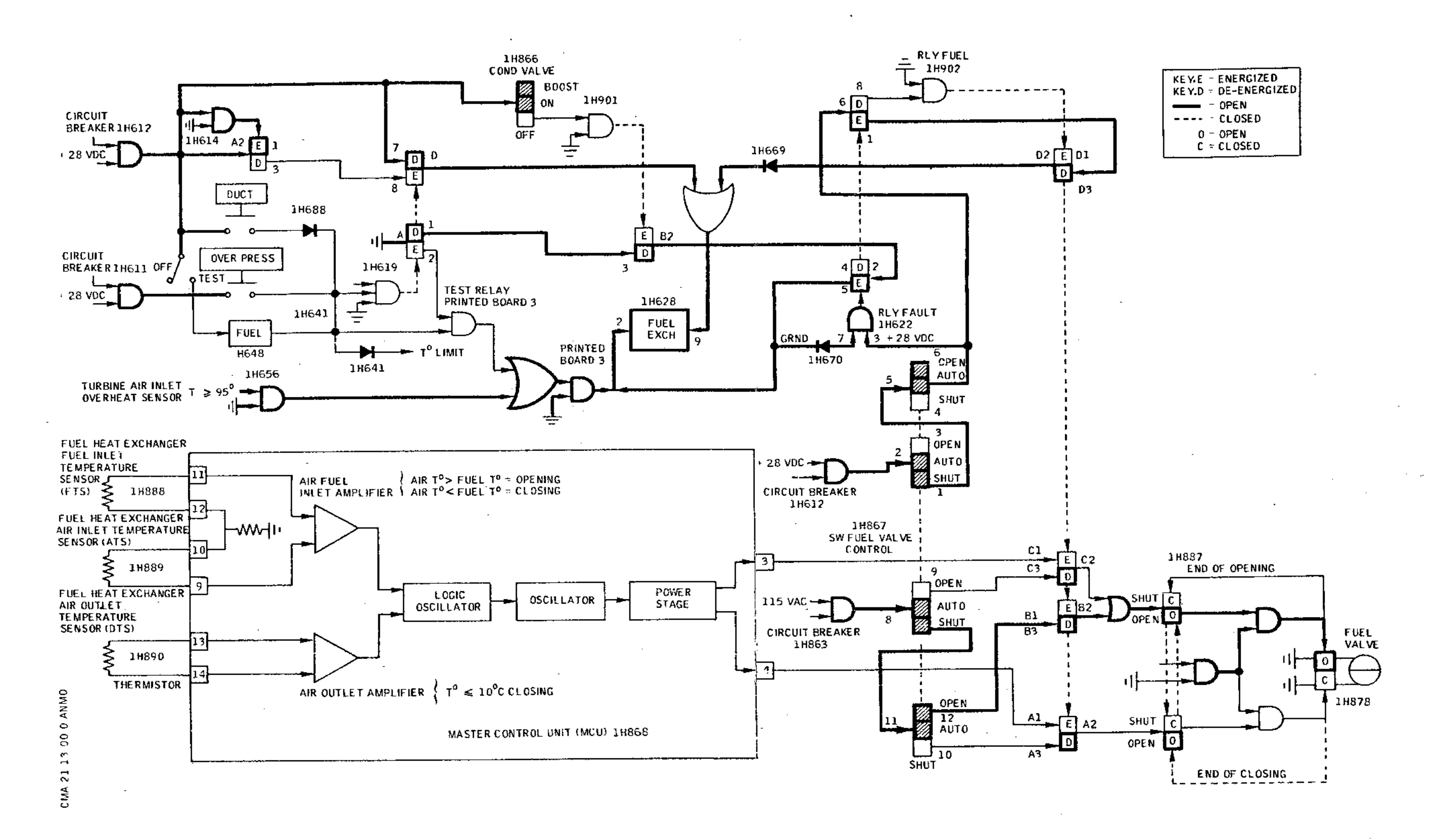
(a3) Circuit breaker 1H863 supplies 115 VAC to terminal B3-B2 of de-energized fuel relay 1H902 which transmits this voltage to the windings of fuel control valve 1H887 which opens. FUEL VALVE magnetic indicator 1H878 displays a horizontal stripe.

(b) If the overheat warning disappears, warning relay 1H622 remains latched by a ground applied by de-energized relays 1H619 and 1H901 which cause :
- FUEL EXCH caption light 1H628 to remain on.
- Fuel control valve not to be supplied by the MCU.
- Fuel control valve to be supplied by circuit breaker 1H863.

(b1) Place FUEL CONTROL VALVE switch H867 in OPEN position :
- Warning relay 1H622 is de-energized and consequently unlatched ; FUEL EXCH caption light 1H628 goes off.

(c) Place FUEL VALVE CONTROL switch in AUTO position ; the system operates as described in paragraph : "Fuel Control Valve Automatic Opening".

INTENTIONALLY BLANK



Fuel Control Valve - Overheat Condition
Figure 019

R

(5)Overheat detection test (Ref. Fig. 020)

(a) On Flight Engineer panel 23-214, AIR COND TEST rotary test switch H648 is placed in FUEL position and OFF-TEST switch H647 is placed in TEST position ; + 28VDC from circuit breaker 1H612 is applied to :

(a1) Relay 1H619 which moves to the energized position and grounds printed board 3 test relay.

(a2) Printed board 3 test relay which moves to the energized position and enables board 3 to ground :
- FUEL EXCH caption light 1H628 at terminal 2
- fault relay 1H622 throught diode 1H670.

(b) On Flight Engineer's panel, with FUEL VALVE CONTROL switch 1H867 placed in AUTO position :

(b1) Circuit breaker 1H612 supplies 28VDC to warning relay 1H622 which moves to the energized position and enables de-energization of fuel relay 1H902 and consequently transmits voltage to FUEL EXCH caption light which comes on.

(b2) The fuel control valve is not supplied by master control unit (MCU).

(b3) Circuit breaker 1H863 supplies 115 VAC to terminals B3-B2 of de-energized relay 1H902 which transmits this voltage to the fuel control valve 1H887 windings ; the valve opens and FUEL VALVE magnetic indicator 1H878 displays a horizontal stripe.

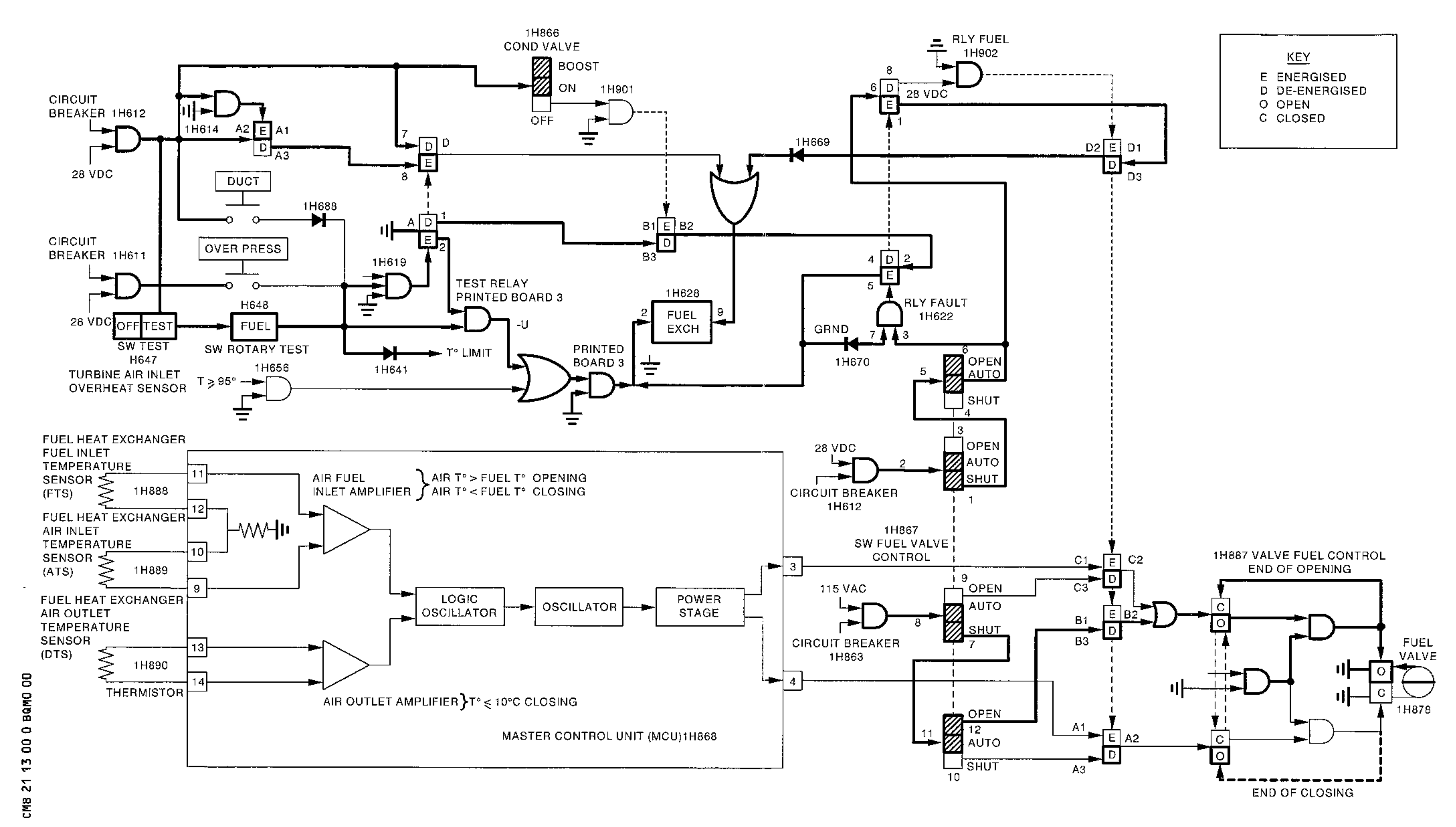
(c) On Flight Engineer's panel place OFF-TEST switch H647 in OFF position. 28VDC from circuit breaker 1H612 is no longer applied to relays 1H619 and printed board 3 test relay which are de-energized and cause board 3 to cut off ground from :

(c1) FUEL EXCH caption light 1H628 which goes off.

(c2) Warning relay 1H622 which moves to the de-energized position and enables energization of fuel relay 1H902 ; fuel relay being in energized position, fuel control valve 1H887 is supplied by MCU and the system operates as

R described in paragraph "Fuel control valve
R automatic opening".

Printed in England



Fuel Control Valve - Test
Figure 020

R E. Fuel Control Valve Manual Operation on Ground

R On ground in the event of an engine failure, a manual con-
R trol enables valve opening and locking.

HEAT EXCHANGER COOLING SYSTEM - TROUBLE SHOOTING

WARNING : OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS IN 24-00-00, SERVICING.

1. General

The following trouble shooting procedures are intended to enable faults found in flight or on the ground to be quickly rectified. The defects are traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary.
All procedures dealing with trouble shooting are based on the assumption that the electrical wiring is serviceable. However, if the fault is not rectified, check the wiring in accordance with the Wiring Diagram Manual.
The system consists of 4 identical groups.
The trouble shooting procedure is described only for group 1.
The name, identifier and location of group 2, 3 and 4 components are indicated in the component identification table.
During the trouble shooting operations, the aircraft is on the ground with shock absorbers compressed.
When the aircraft is on the ground, with engine shut down the heat exchanger cooling system cannot be tested completely.
The trouble shooting procedure deals only with the trouble shooting symptoms noticed with engine running on the ground or in flight.
To carry out the trouble shooting procedures, the ground air supply unit mentioned in paragraph 2A will be used if necessary to simulate the operation of the various valves. However, it is not possible to obtain a correct pressure, temperature or airflow with the ground air supply unit available.

2. Prepare

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit Ground Air Supply Unit - Relative minimum pressure : 4.5 bars - Minimum airflow : 0.4 kg/s - Maximum airflow : 0.6 kg/s The temperature must not exceed 300°C	
Multimeter	

B. Prepare

(1) Check that the circuit breakers are set (Ref. 21-10-00, Adjustment/Test, paragraph 2).

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(3) If necessary, connect the ground air supply unit and pressurize the aircraft system.
Follow instructions detailed in 21-11-14, Adjustment/Test.

3. Trouble Shooting

```
**************************************************
* System not operating, FUEL EXCH warning light is  *
* extinguished.                                    *
**************************************************
    ||      |
    ||      |
    ||      |   ------------------------------------------------
    OK     NOT OK--| COND VALVE switch in OFF position.          |
    ||             | FUEL VALVE switch in AUTO position.         |
    ||             | FUEL EXCH warning light is illuminated.     |
    ||             |                                             |
    ||             | Ref. Chart 101                              |
    ||          ------------------------------------------------
    ||
**************************************************
* When O/PRESS PTT test is performed FUEL EXCH     *
* warning light is extinguished.                   *
**************************************************
    ||      |
    ||      |   ------------------------------------------------
    OK     NOT OK  | FUEL VALVE switch in AUTO position.         |
    ||      |      | PTT O/PRESS warning light comes on.         |
    ||      |------| GR1 FUEL EXCH warning light comes on.       |
    ||             |                                             |
    ||             | Replace diode 1H641 [4].                    |
    ||          ------------------------------------------------
    ||
**************************************************
* FUEL test is correct.                            *
**************************************************
    ||      |
    ||      |   ------------------------------------------------
    OK     NOT OK  | FUEL VALVE switch in AUTO position.         |
    ||      |      | AIR COND TEST switch in TEST position.      |
    ||      |------| Rotary test switch in FUEL position.        |
    ||      |      | Group 2,3,4, FUEL EXCH warning lights are   |
    ||      |      | illuminated.                                |
    ||      |      | Group 1 FUEL EXCH warning light is extinguished|
    ||      |      | Ref. chart 102                              |
    ||      |   ------------------------------------------------
    ||      |
    ||      |
```

```
  ||        |
  ||        |        ---------------------------------------------------
  ||        |       | FUEL VALVE magnetic indicator displays SHUT     |
  ||     NOT OK     | FUEL VALVE switch in AUTO position.             |
  ||        |       | AIR COND TEST switch in TEST position.          |
  ||        |-----| Rotary test switch in FUEL position.              |
  ||                | FUEL VALVE magnetic indicator displays OPEN.    |
  ||                | FUEL EXCH warning light does not come on.       |
  ||                |                                                 |
  ||                | Ref. Chart 103                                  |
  ||                 ---------------------------------------------------
  ||
*****************************************************
* FUEL EXCH and FAULT warning lights are            *
* extinguished.                                     *
*****************************************************
  ||        |
  ||        |        ---------------------------------------------------
  OK     NOT OK     | COND VALVE switch in ON or BOOST position.      |
  ||        |       | FUEL VALVE switch in AUTO position.             |
  ||        |       | FUEL EXCH warning light is illuminated.         |
  ||        |       | FUEL VALVE magnetic indicator displays OPEN.    |
  ||        |       | Temperature selector in AUTO position.          |
  ||        |-----| Temperature control valve position indicator    |
  ||                | in C position.                                  |
  ||                | FAULT warning light (smoke) illuminated.        |
  ||                | MASS FLOW indicator in Z position.              |
  ||                |                                                 |
  ||                | Replace circuit breaker H1000 [21].             |
  ||                 ---------------------------------------------------
  ||
*****************************************************
* PRIM EXCH warning light is extinguished.          *
*****************************************************
  ||        |
  ||        |        ---------------------------------------------------
  ||        |       | COND VALVE switch in ON or BOOST position.      |
  OK     NOT OK     | PRIM EXCH warning light is illuminated.         |
  ||        |       | AIR warning light illuminated on master warning|
  ||        |       | panel.                                          |
  ||        |       | Associated aural warning sounds.                |
  ||        |       | COND VALVE magnetic indicator displays SHUT.    |
  ||        |-----| RAM AIR magnetic indicator displays OPEN.         |
  ||        |       | Temperature indicated on CAU IN indicator is    |
  ||        |       | higher than 220°C.                              |
  ||        |       | Normal airflow when the group is re-opened.     |
  ||        |       | RAM AIR magnetic indicator displays OPEN.       |
  ||        |       |                                                 |
  ||        |       | Ref. Chart 104                                  |
  ||        |        ---------------------------------------------------
```

NOT OK

COND VALVE switch in ON or BOOST position.
PRIM EXCH warning light is illuminated.
AIR warning light illuminated on master warning panel.
Associated aural warning sounds.
COND VALVE magnetic indicator displays shut
RAM AIR magnetic indicator displays open.
Temperature indicated on CAU IN indicator is higher than 220°C.
Normal airflow when the group is re-opened.
RAM AIR magnetic indicator displays shut.

Ref. Chart 105

NOT OK

COND VALVE switch in ON or BOOST position.
PRIM EXCH warning light is illuminated.
AIR warning light is illuminated on master warning panel.
Associated aural warning sounds.
COND VALVE magnetic indicator displays Shut.
RAM AIR magnetic indicator displays Shut.
Temperature indicated on CAU IN indicator is higher than 220°C.

Replace ram air control valve 1H886 [15].

```
****************************************************
* Landing gears downlocked.                        *
* On the ground, the ejector control valve is open. *
****************************************************
```

OK

NOT OK

COND VALVE switch in ON or BOOST position.
RAM AIR magnetic indicator displays OPEN.
JET PUM magnetic indicator displays SHUT.
PRIM EXCH warning light may come on.

Ref. Chart 106

```
*****************************************************
* FUEL EXCH and DUCT warning lights are extinguished*
*****************************************************
    ||      |
    ||      |     -----------------------------------------------
    OK     NOT OK | COND VALVE switch in ON or BOOST position.  |
    ||      |     | FUEL VALVE switch in AUTO position.         |
    ||      |     | FUEL EXCH warning light is illuminated.     |
    ||      |     | DUCT warning light is illuminated.          |
    ||      |     | AIR warning light is illuminated on master  |
    ||      |-----| warning panel.                              |
    ||      |     | Associated aural warning sounds.            |
    ||      |     | COND VALVE magnetic indicator displays SHUT.|
    ||      |     | FUEL VALVE magnetic indicator displays SHUT.|
    ||      |     |                                             |
    ||      |     | Replace fuel control valve 1H887 [16].      |
    ||      |     -----------------------------------------------
    ||      |
    ||      |     -----------------------------------------------
    ||      |     | COND VALVE switch in ON or BOOST position.  |
    ||      |     | FUEL VALVE switch in AUTO position.         |
    OK     NOT OK | FUEL VALVE magnetic indicator displays OPEN.|
    ||      |     | FUEL EXCH warning light is illuminated.     |
    ||      |     | Associated aural warning sounds.            |
    ||      |-----| Temperature indicated on DUCT temperature   |
    ||            | indicator is greater than 120°C.            |
    ||            | COND VALVE magnetic indicator displays SHUT.|
    ||            | AIR warning light illuminated on master warning|
    ||            | panel.                                      |
    ||            |                                             |
    ||            | Ref. Chart 107                              |
    ||            -----------------------------------------------
    ||
*****************************************************
* FUEL EXCH warning light is extinguished.          *
*****************************************************
    ||      |
    ||      |     -----------------------------------------------
    OK     NOT OK | COND VALVE switch in ON or BOOST position.  |
            |     | FUEL VALVE switch in AUTO position.         |
            |     | FUEL EXCH warning light is illuminated.     |
            |-----| FUEL VALVE magnetic indicator displays OPEN.|
R           |     | Place FUEL VALVE switch in OPEN position.   |
R           |     | FUEL EXCH warning light is extinguished.    |
R           |     |                                             |
R           |     | Ref. Chart 108                              |
            |     -----------------------------------------------
            |
```

```
    |
    |     ------------------------------------------------------
    |    | COND VALVE switch in ON or BOOST position.           |
NOT OK   | FUEL VALVE switch in AUTO position.                  |
    |    | FUEL EXCH warning light is illuminated.              |
    |    | FUEL VALVE magnetic indicator displays OPEN.         |
    |----| FUEL EXCH warning light remains illuminated          |
         | when the group is re-opened and after placing        |
         | FUEL VALVE switch in OPEN position.                  |
         |                                                      |
         | Ref. Chart 109                                       |
          ------------------------------------------------------
```

```
    *************************************-----------------------------
    * COND VALVE SWITCH IN OFF POSITION  *| GROUND EQUIPMENT REQUIRED |
    * FUEL VALVE SWITCH IN AUTO POSITION *|---------------------------|
R   *                                    *| DESCRIPTION       PART NO.|
    * FUEL EXCH WARNING LIGHT IS         *|---------------------------|
    * ILLUMINATED.                       *| MULTIMETER                |
    *************************************-----------------------------
    ****************************************************
R   * Remove overheat safety box 1H649 [6]. Measure the *
    * resistance between terminals 43 and 53 of         *
R   * connector 1H649A. The resistance is 112 ohms      *
    * approximately.                                    *
    ****************************************************
        ||    |
       YES   NO    *********************************************
R       ||    |    * Disconnect connector from sensor 1H656 [7] *
        ||    |---* Measure the resistance between terminals A *
R       ||         * and B. The resistance is smaller than      *
        ||         * 137 ohms.                                  *
        ||         *********************************************
        ||              |          |
        ||             YES         NO        ------------------------------
        ||              |          |---------| Replace sensor 1H656 [7].  |
        ||              |                    ------------------------------
        ||              |
        ||              |                    ------------------------------
        ||              |--------------------| Repair electrical circuits.|
        ||                                   ------------------------------
        ||
        ||                                   ------------------------------
        ||-----------------------------------| Replace overheat safety    |
                                             | box 1H649 [6].             |
                                             ------------------------------
```

Chart 101

```
***************************************-------------------------------
* FUEL VALVE SWITCH IN AUTO POSITION.*| GROUND EQUIPMENT REQUIRED    |
* AIR COND TEST SWITCH IN TEST       *|-----------------------------|
* POSITION.                          *| DESCRIPTION        PART NO.  |
* ROTARY TEST SWITCH IN FUEL POSITION*|-----------------------------|
* GROUP 2,3,4 FUEL EXCH WARNING      *| MULTIMETER                  |
* LIGHTS ARE ILLUMINATED.            *-------------------------------
* GROUP 1 WARNING LIGHT IS           *
* EXTINGUISHED.                      *
***************************************

******************************************************
* Remove overheat safety box 1H649. On aft connector*
* 1H649A, measure the voltage between terminal 7 and*
* the aircraft ground.                               *
******************************************************
      ||               |
      28V              0V
      ||               |     ---------------------------------------
      ||               |----| Replace rotary test switch H648 [5]. |
      ||                     ---------------------------------------
      ||
******************************************************
* On connector 1H649A,measure the resistance between*
* terminals 53-43 and 53-34 (Turbine air inlet over-*
* temperature detector 1H656).                       *
* The temperature value must be the same between     *
* each pair of terminal and approximately equal to   *
* 112 ohms at 30°C or 100 ohms at 0°C.               *
* Check insulation between terminals 53,43,34 and    *
* the aircraft ground.                               *
******************************************************
      ||               |
      OK             NOT OK
      ||               |
      ||               |
```

Chart 102 (Sheet 1 of 4)

R * Disconnect connector 1H656A from detector
R * 1H656. On detector, measure the resistance
* between terminals B-A and B-C. The
* resistance values must be approximately
* equal to 112 ohms 30°C and 100 ohms at
* 0°C.
R * Check insulation between detector pins
R * and detector body.

OK / NOT OK

NOT OK → Replace detector 1H656 [7].

OK → Check and repair wiring between detector 1H656 and overheat safety box 1H649 Ref. WDM 21-13-01

* On connector 1H649A, measure continuity between
* terminal 14 and the aircraft ground (Rotary test
* switch H648 in FUEL position and AIR COND TEST
* switch H647 in TEST position).

OK / NOT OK

NOT OK → Replace diode 1H641 [4].

Chart 102 (Sheet 2 of 4)

```
*************************************************
* FUEL VALVE switch in AUTO position. On unit   *
* 14-123, on UT1811, check voltage between      *
* terminal 3A and the aircraft ground.          *
*************************************************
      ||                |
      28V               0V         ------------------------------------
      ||                |---------| Replace FUEL VALVE switch         |
      ||                          | 1H876 [16].                       |
      ||                           ------------------------------------
      ||
*************************************************
* On unit 14-123, ground terminal 3B of         *
* connector UT1811, FUEL EXCH warning light     *
* comes on.                                     *
*************************************************
      ||                |
      NO               YES         ------------------------------------
      ||                |---------| Replace overheat safety box       |
      ||                          | 1H649 [6].                        |
      ||                           ------------------------------------
      ||
*************************************************
* Install overheat safety box 1H649. FUEL VALVE*
* switch placed in SHUT position. In unit       *
* 14-123, check diode 1H670.                    *
*************************************************
      ||                |
      OK              NOT OK       ------------------------------------
      ||                |---------| Replace diode 1H670 [10].         |
      ||                           ------------------------------------
      ||
*************************************************
* In unit 14-123, replace relay 1H622           *
* FUEL VALVE switch in AUTO position.           *
* FUEL EXCH warning light comes on.             *
*************************************************
      ||                |
      NO               YES         ------------------------------------
      ||                |---------| Relay 1H622 [2] was faulty        |
      ||                           ------------------------------------
      ||
      ||
      ||
```

Chart 102 (Sheet 3 of 4)

```
****************************************************
* FUEL VALVE switch in SHUT position. Check diode  *
* 1H669 in unit 14-123.                            *
****************************************************
      ||                  |
      OK                NOT OK          -----------------------------
      ||                  |-----------| Replace diode 1H669 [9].   |
      ||                                -----------------------------
      ||
****************************************************
* In unit 14-123, check continuity between terminals*
* D3 and D2 of relay 1H902.                        *
****************************************************
      ||                  |
      OK                NOT OK          -----------------------------
      ||                  |-----------| Replace relay 1H902 [20].  |
      ||                                -----------------------------
      ||
      ||                                -----------------------------
      ||------------------------------| Replace FUEL EXCH warning  |
                                      | light [3].                 |
                                        -----------------------------
```

Chart 102 (Sheet 4 of 4)

```
**************************************-------------------------------
* FUEL VALVE MAGNETIC INDICATOR      *| GROUND EQUIPMENT REQUIRED   |
* DISPLAYS SHUT.                     *|-----------------------------|
* FUEL VALVE SWITCH IN AUTO POSITION.*| DESCRIPTION        PART NO. |
* AIR COND TEST SWITCH IN TEST       *|-----------------------------|
* POSITION.                          *| MULTIMETER                  |
* ROTARY TEST SWITCH IN FUEL POSITION*-------------------------------
* FUEL VALVE MAGNETIC INDICATOR      *
* DISPLAYS OPEN.                     *
* FUEL EXCH WARNING LIGHT DOES NOT   *
* COME ON.                           *
**************************************

*****************************************************
* In unit 14-123, remove relay 1H902. On the latter,*
* check continuity between terminals D2 and D3.     *
*****************************************************
      ||                  |
    CONTINUITY       DISCONTINUITY  -------------------------------
      ||                  |---------| Replace relay 1H902 [20].   |
      ||                            -------------------------------
      ||
*****************************************************
* In unit 14-123, check diode 1H669.                *
*****************************************************
      ||                  |
      OK               NOT OK       -------------------------------
      ||                  |---------| Replace diode 1H669 [9].    |
      ||                            -------------------------------
      ||
      ||                            -------------------------------
      ||----------------------------| Replace relay 1H622 [2].    |
                                    -------------------------------
```

Chart 103

```
**************************************
* COND VALVE SWITCH IN ON OR BOOST   *
* POSITION.                          *
* PRIM EXCH WARNING LIGHT IS         *
* ILLUMINATED.                       *
* AIR WARNING LIGHT IS ILLUMINATED   *
* ON MASTER PANEL.                   *
* ASSOCIATED AURAL WARNING SOUNDS    *
* COND VALVE MAGNETIC INDICATOR      *
* DISPLAYS SHUT.                     *
* RAM AIR MAGNETIC INDICATOR DISPLAYS*
* OPEN.                              *
* TEMPERATURE INDICATED ON CAU       *
* INDICATOR IS HIGHER THAN 220°C.    *
* NORMAL AIRFLOW WHEN THE GROUP IS   *
* RE-OPENED. RAM AIR MAGNETIC        *
* INDICATOR DISPLAYS OPEN.           *
**************************************

*****************************************************
* Check that changeover valve operates correctly.   *
*****************************************************
    |        |
    |        |    *********************************
  NOT OK     OK---* Check position of fire flap    *
    |             *********************************
    |                  |   |
    |                  OK  NOT OK       ------------------------------
    |                  |   |---------| Ref. Chapter 26.              |
    |                  |                ------------------------------
    |                  |
    |                  |                ------------------------------
    |                  |               | Replace primary heat         |
    |                  |---------------| exchanger [25].              |
    |                                   ------------------------------
    |
    |                                   ------------------------------
    |                                  | Replace or repair            |
    |----------------------------------| changeover valve.            |
                                        ------------------------------
```

Chart 104

```
**************************************
* COND VALVE SWITCH IN ON OR BOOST   *
* POSITION.                          *
* PRIM EXCH WARNING LIGHT IS         *
* ILLUMINATED.                       *
* AIR WARNING LIGHT COMES ON ON      *
* MASTER WARNING PANEL.              *
* ASSOCIATED AURAL WARNING SOUNDS.   *
* COND VALVE MAGNETIC INDICATOR      *
* DISPLAYS SHUT.                     *
* RAM AIR MAGNETIC INDICATOR DISPLAYS*
* OPEN.                              *
* TEMPERATURE INDICATED ON CAU IN    *
* INDICATOR IS HIGHER THAN 220°.     *
* NORMAL AIRFLOW WHEN THE GROUP IS   *
* RE-OPENED.                         *
* RAM AIR MAGNETIC INDICATOR DISPLAYS*
* SHUT.                              *
**************************************

************************************************
* Carry out the test procedure described in    *
* 21-12-12, Adjustment/Test 2C(b).             *
* The valve operates.                          *
************************************************
      ||                    |
     YES                    NO          ------------------------------
      ||                    |----------| Replace ram air control    |
      ||                               | valve [15].                |
      ||                                ------------------------------
      ||
************************************************
* Remove blanking plug installed at the        *
* location of primary heat exchanger           *
* thermostat duct.                             *
* The ram air control valve opens.             *
************************************************
      ||                    |
     YES                    NO          ------------------------------
      ||                    |          | Replace primary heat       |
      ||                    |----------| exchanger thermostat [23]. |
      ||                                ------------------------------
      ||
      ||                                ------------------------------
      ||                               | Replace cooling air        |
      ||-------------------------------| thermostat [24].           |
                                        ------------------------------
```

Chart 105

```
*************************************-------------------------------
* COND VALVE SWITCH IN ON OR BOOST   *| GROUND EQUIPMENT REQUIRED    |
* POSITION.                          *|------------------------------|
* RAM AIR MAGNETIC INDICATOR DISPLAYS*| DESCRIPTION       PART NO.   |
* OPEN.                              *|------------------------------|
* JET PUMP MAGNETIC INDICATOR        *| MULTIMETER                   |
* DISPLAYS SHUT.                     *-------------------------------
* PRIM EXCH WARNING LIGHT MAY COME ON*
*************************************

***********************************************
* Disconnect connector 1H881A from ejector    *
* control valve 1H882. On connector 1H882A    *
* (Power side), measure the voltage between   *
* terminals B and A.                          *
***********************************************
    ||                 |
    0V                28V                -------------------------------
    ||                 |                | Replace ejector control      |
    ||                 |----------------| valve 1H882 [13].            |
    ||                                   -------------------------------
    ||
    ||                                   -------------------------------
    ||----------------------------------| Replace relay G328 [1].      |
                                         -------------------------------
```

Chart 106

```
*************************************
* COND VALVE SWITCH IN ON OR BOOST   *
* POSITION.                         *
* FUEL VALVE SWITCH IN AUTO POSITION.*
* FUEL VALVE MAGNETIC INDICATOR     *
* DISPLAYS OPEN.                    *
* FUEL EXCH WARNING LIGHT ILLUMINATED*
* DUCT WARNING LIGHT ILLUMINATED    *
* ASSOCIATED AURAL WARNING SOUNDS.  *
* TEMPERATURE INDICATED ON DUCT     *
* INDICATOR IS HIGHER THAN 120°C.   *
* COND VALVE MAGNETIC INDICATOR     *
* DISPLAYS SHUT.                    *
* AIR WARNING LIGHT ILLUMINATED ON  *
* MASTER WARNING PANEL.             *
*************************************

*************************************
* Check that manual control lever is *
* correctly engaged.                *
* Place FUEL VALVE switch in OPEN   *
* then in SHUT position ; on the    *
* valve, check that manual control  *
* lever moves.                      *
*************************************
        ||           |
        OK           NOT OK          -----------------------------
        ||           |               | Replace fuel control      |
        ||           |---------------| valve 1H887 [16].         |
        ||                           -----------------------------
        ||
*************************************
* Replace fuel by pass valve        *
* (Ref. Chapter 28)                 *
* The fault disappears.             *
*************************************
        ||           |
        OK           NOT OK          -----------------------------
        ||           |               | Replace fuel heat exchanger|
        ||           |---------------| [22].                     |
        ||                           -----------------------------
        ||
        ||                           -----------------------------
        ||                           | The fuel by-pass valve    |
        ||---------------------------| was faulty.               |
                                     -----------------------------
```

Chart 107

```
*************************************-----------------------------
* COND VALVE SWITCH IN ON OR BOOST   *| GROUND EQUIPMENT REQUIRED |
* POSITION.                          *|---------------------------|
* FUEL VALVE SWITCH IN AUTO POSITION *| DESCRIPTION      PART NO. |
* FUEL EXCH WARNING LIGHT ILLUMINATED*|---------------------------|
* FUEL VALVE MAGNETIC INDICATOR      *| MULTIMETER                |
* DISPLAYS OPEN.                     *-----------------------------
* PLACE FUEL VALVE SWITCH IN OPEN    *
* POSITION.                          *
* FUEL EXCH WARNING LIGHT IS         *
* EXTINGUISHED.                      *
**************************************

*******************************************
* On master control unit test connector,  *
* check that voltage between terminals X  *
* and Y is lower than 3 volts.            *
*******************************************
    ||          |
    OK          NOT OK     ------------------------------------
    ||          |         | Disconnect sensor 1H889. On sensor |
    ||          |         | side, check the resistance between |
    ||          |---------| terminals A and D of sensor        |
    ||                    | (100 ohms at 0°C, 110 ohms at 25°). |
    ||                    | Check that insulation is correct   |
    ||                    | between terminals and sensor body. |
    ||                     ------------------------------------
    ||                      |   |
    ||                     OK NOT OK
    ||                      |   |     ----------------------------
    ||                      |   |----| Replace sensor 1H889 [18]. |
    ||                      |         ----------------------------
    ||                      |
    ||                      |         ----------------------------
    ||                      |        | Check wiring between       |
    ||                      |--------| sensor and master control  |
    ||                               | unit.                      |
    ||                               | Ref. WDM 21-13-01          |
    ||                                ----------------------------
    ||
*************************************************
* On master control unit test connector, check  *
* that the voltage between terminals X and Y    *
* is lower than 3 Volts.                        *
*************************************************
    ||     |
    OK    NOT OK
    ||     |
```

Chart 108 (Sheet 1 of 3)

```
  ||         |        ****************************************
  ||         |        * Disconnect sensor 1H888. On          *
  ||         |        * sensor side, check the resistance    *
  ||         |------* between terminals A and D              *
  ||                  * (100 ohms at 0°C and 110 ohms at     *
  ||                  * 25°C). Check insulation between the*
  ||                  * terminals and the valve body.        *
  ||                  ****************************************
  ||                      |          |
  ||                      OK         NOT OK ------------------------------
  ||                      |          |----| Replace sensor 1H888 [17). |
  ||                      |               ------------------------------
  ||                      |
  ||                      |               ------------------------------
  ||                      |               | Check wiring between sensor|
  ||                      |---------------| and master control unit    |
  ||                                      | Ref. WDM 21-13-01          |
  ||                                      ------------------------------
  ||
**************************************************
* On master control unit test connector, check  *
* that voltage between terminals U and V is     *
* lower than 3 Volts.                           *
**************************************************
  ||         |
  OK     NOT OK   ****************************************
  ||         |        * Disconnect sensor 1H890 electrical *
  ||         |        * connector. On sensor, check the     *
  ||         |        * resistance between terminals A and *
  ||         |------* D of connector (2500 ohms at 20°C    *
  ||                  * and 2000 ohms at 25°C). Check       *
  ||                  * insulation between terminals and    *
  ||                  * the sensor body.                    *
  ||                  ****************************************
  ||                       |          |
  ||                       OK         NOT OK ------------------------------
  ||                       |          |----| Replace sensor 1H890 [19]. |
  ||                       |               ------------------------------
  ||                       |
  ||                       |               ------------------------------
  ||                       |               | Check wiring between sensor|
  ||                       |---------------| and master control unit    |
  ||                                       | Ref. WDM 21-13-01          |
  ||                                       ------------------------------
  ||
  ||
```

Chart 108 (Sheet 2 of 3)

```
************************************************
* On master control unit test connector, shunt *
* terminals U and V and X and Y. Check that    *
* voltage is 115 VAC between terminals Z and G.*
************************************************
    ||                 |
    OK              NOT OK    -----------------------------------
    ||                 |---------| Replace master control unit   |
    ||                           | 1H868 [11].                   |
    ||                        -----------------------------------
    ||
******************************************************
* On master control unit test connector, remove      *
* shunt between terminals X and Y ; install the shunt*
* between terminals W and Y. Check that voltage      *
* is 115 VAC between terminals A and G.              *
******************************************************
    ||                 |
    OK              NOT OK    -----------------------------------
    ||                 |---------| Replace master control unit [11]|
    ||                        -----------------------------------
    ||
    ||                        -----------------------------------
R   ||---------------------------| Replace relay 1H902 [20].     |
                              -----------------------------------
```

Chart 108 (Sheet 3 of 3)

```
************************************
* COND VALVE SWITCH IN ON OR BOOST   *
* POSITION.                          *
* FUEL VALVE SWITCH IN AUTO POSITION.*
* FUEL EXCH WARNING LIGHT ILLUMINATED*
* FUEL VALVE MAGNETIC INDICATOR      *
* DISPLAYS OPEN.                     *
* FUEL EXCH WARNING LIGHT REMAINS    *
* ILLUMINATED WHEN THE GROUP IS RE-  *
R * OPENED AFTER PLACING FUEL VALVE    *
R * SWITCH IN OPEN POSITION.           *
************************************
```

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	

```
******************************************************
* Remove overheat safety box 1H649.                  *
* On connector 1H649A, measure the resistance        *
* between terminals 53 and 43 and between terminals  *
* 53 and 34 (turbine air inlet overtemperature       *
* detector 1H656).                                   *
* The resistance value must be identical between     *
* each pair of terminal and approximately equal      *
* to 112 ohms at 30°C and 100 ohms at 0°C.           *
* Check that insulation is correct between           *
* terminals 53,43,34 and the aircraft ground.        *
******************************************************
    ||          |
   YES          |    ***********************************
    ||          |    * Disconnect connector 1H656A from *
R   ||          |    * detector 1H656. On detector, mea-*
    ||          NO   * sure the resistance between ter- *
    ||          |    * minals BA and BC. The resistance *
    ||          |----* values must be approximately     *
    ||               * equal to 112 ohms at 30°C and 100*
    ||               * ohms at 0°C.                     *
    ||               * Check that insulation is correct *
R   ||               * between detector pins and the    *
    ||               * aircraft ground.                 *
    ||               ***********************************
    ||                     |          |
    ||                    YES         NO
    ||                     |          |
```

Chart 109 (Sheet 1 of 2)

Replace detector 1H656 [7].

Repair wirings between detector 1H656 and overheat safety box 1H649 Ref. WDM 21-13-01

Replace overheat safety box 1H649 [6].

Chart 109 (Sheet 2 of 2)

	ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
	[1] Relay GR 1		2-213	G328		32-00-00	21-13-11
	GR 2			G327		R/I	21-13-21
	GR 3			G371			21-13-31
	GR 4			G330			21-13-41
R	[2] Relay GR 1	123 BB	14-123	1H622		21-10-00	21-13-11
R	GR 2	123 BB	14-123	2H622		R/I	21-13-21
R	GR 3	123 BB	17-123	3H622			21-13-31
R	GR 4	123 BB	17-123	4H622			21-13-41
	[3] Warning light FUEL EXCH GR 1		2-214	1H628		21-10-00	21-13-11
	GR 2			2H628		R/I	21-13-21
	GR 3			3H628			21-13-31
	GR 4			4H628			21-13-41
	[4] Diode GR 1		23-214	1H641		21-10-00	21-12-11
	GR 2			2H641		R/I	21-12-21
	GR 3			3H641			21-12-31
	GR 4			4H641			21-12-41
	[5]Switch - Rotary test		23-214	H648		21-12-72 R/I	21-12-11
	[6] Safety box- Overheat GR 1		10-215	1H649		21-12-71	21-13-11
	GR 2		10-215	2H649		R/I	21-13-21
	GR 3		9-216	3H649			21-13-31
	GR 4		10-216	4H649			21-13-41
	[7] Detector - Turbine air inlet overtem- perature GR 1	534 AT		1H656		21-13-34	21-13-11
	GR 2	533 BT		2H656		R/I	21-13-21
	GR 3	633 BT		8H656			21-13-31
	GR 4	634 AT		4H656			21-13-41
	[8] Switch - FUEL VALVE		2-214	1H867		21-10-00	21-13-11
				2H867		R/I	21-13-21
				3H867			21-13-31
				4H867			21-13-41

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
[9] Diode GR 1	123 BB	14-123	1H669		21-10-00	21-13-11
GR 2	123 BB	14-123	2H669		R/I	21-13-21
GR 3	123 BB	17-123	3H669			21-13-31
GR 4	123 BB	17-123	4H669			21-13-41
[10] Diode GR 1	123 BB	14-123	1H670		21-10-00	21-13-11
GR 2	123 BB	14-123	2H670		R/I	21-13-21
GR 3	123 BB	17-123	3H670			21-13-31
GR 4	123 BB	17-123	4H670			21-13-41
[11] Master control unit						
GR 1		2-215	1H868		21-13-51	21-13-11
GR 2		1-215	2H868		R/I	21-13-21
GR 3		1-216	3H868			21-13-31
GR 4		2-216	4H868			21-13-41
[12] Relay GR 1	123 BB	14-123	1H872		21-10-00	21-13-01
GR 2	123 BB	14-123	2H872		R/I	21-13-02
GR 3	123 BB	17-123	3H872			21-13-03
GR 4	123 BB	17-213	4H872			21-13-04
[13] Valve - Ejector control						
GR 1	415 CL		1H882		21-13-12	21-13-11
GR 2	426 CR		2H882		R/I	21-13-21
GR 3	435 CL		3H882			21-13-31
GR 4	446 CR		4H882			21-13-41
R [14] Deleted						
[15] Valve - Ram air control primary heat exchanger						
GR 1	415 AL		1H886		21-12-12	21-12-05
GR 2	426 AR		2H886		R/I	21-12-06
GR 3	435 AL		3H886			21-12-07
GR 4	446 AR		4H886			21-12-08

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[16] Valve - Fuel control						
GR 1	532 CT		1H887		21-13-31	21-13-11
GR 2	531 BT		2H887		R/I	21-13-21
GR 3	631 BT		3H887			21-13-31
GR 4	632 CT		4H887			21-13-41
[17] Sensor - Temperature, fuel heat exchanger inlet						
GR 1	532 AT		1H888		21-13-32	21-13-11
GR 2	531 AT		2H888		R/I	21-13-21
GR 3	631 AT		3H888			21-13-31
GR 4	632 AT		4H888			21-13-41
[18] Sensor - Temperature, fuel heat exchanger air inlet GR 1	534 AT		1H889		21-13-33	21-13-11
GR 2	533 BT		2H889		R/I	21-13-21
GR 3	633 BT		3H889			21-13-31
GR 4	634 AT		4H889			21-13-41
[19] Sensor - Temperature, fuel heat exchanger air R outlet GR 1	534 AT		1H890		21-13-35	21-13-11
GR 2	533 BT		2H890		R/I	21-13-21
GR 3	633 BT		3H890			21-13-31
GR 4	634 AT		4H890			21-13-41
[20] Relay GR 1	123 BB	14-123	1H902		21-10-00	21-13-11
GR 2	123 BB	14-123	2H902		R/I	21-13-21
GR 3	123 BB	17-123	3H902			21-13-31
GR 4	123 BB	17-123	4H902			21013041

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ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
[21] Circuit breaker - TEMP SELECTOR AUTO SUP & CONT GR 1		2-213	H1000	B-17	24-50-00 R/I	21-13-01
GR 2		4-213	H1001	E-11		21-13-02
GR 3		2-213	H1002	G-16		21-13-03
GR 4		4-213	H1003	B-12		21-13-04
[22] Heat exchanger-Fuel GR 1	534 AT				21-12-33 R/I	
GR 2	533 BT					
GR 3	633 BT					
GR 4	634 AT					
[23] Thermostat Primary heat exchanger GR 1	534 AT				21-12-31 R/I	
GR 2	533 BT					
GR 3	633 BT					
GR 4	634 AT					
[24] Thermostat Cooling air GR 1	415 AL				21-12-13 R/I	
GR 2	426 AR					
GR 3	435 AL					
GR 4	446 AR					
[25] Heat exchanger - Primary GR 1					21-12-11 R/I	
GR 2						
GR 3						
GR 4						

Component Identification
Table 101

EJECTOR CONTROL VALVE - REMOVAL/INSTALLATION

1. General

R The removal/installation procedure is identical for the valve
R of each air conditioning group. These valves are located on RH
R side of engines 2 and 4 and on LH side of engines 1 and 3.

2. Ejector Control Valve

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 1.80 m (5 ft. 11 in.)	
Circuit Breaker Safety Clips	

B. Prepare

(1) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1 GRP 1 AIR GEN CONT & IND	1-213	1H 862	D13
Group 2 GRP 2 AIR GEN CONT & IND	5-213	2H 862	F 9
Group 3 GRP 3 AIR GEN CONT & IND	15-215	3H 862	B 3
Group 4 GRP 4 AIR GEN CONT & IND	15-216	4H 862	B23

(2) Position access platform.

(3) Open access doors :

415CL for removal of group 1 valve
426CR for removal of group 2 valve
435CL for removal of group 3 valve
446CR for removal of group 4 valve

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1).

(2) Remove clamps (2) and (6).

(3) Remove valve (4).

(4) Discard seals (3) and (5).

D. Install

(1) Install valve (4) fitted with new seals (3) and (5). The arrow must indicate the airflow direction (it must point upwards).

(2) Install clamps (2) and (6) and tighten them.

NOTE : Clamps must be installed with great care. Torque to 0.6 m.daN (53.082 lbf.in.).

(3) Connect electrical connector (1).

R E. Test

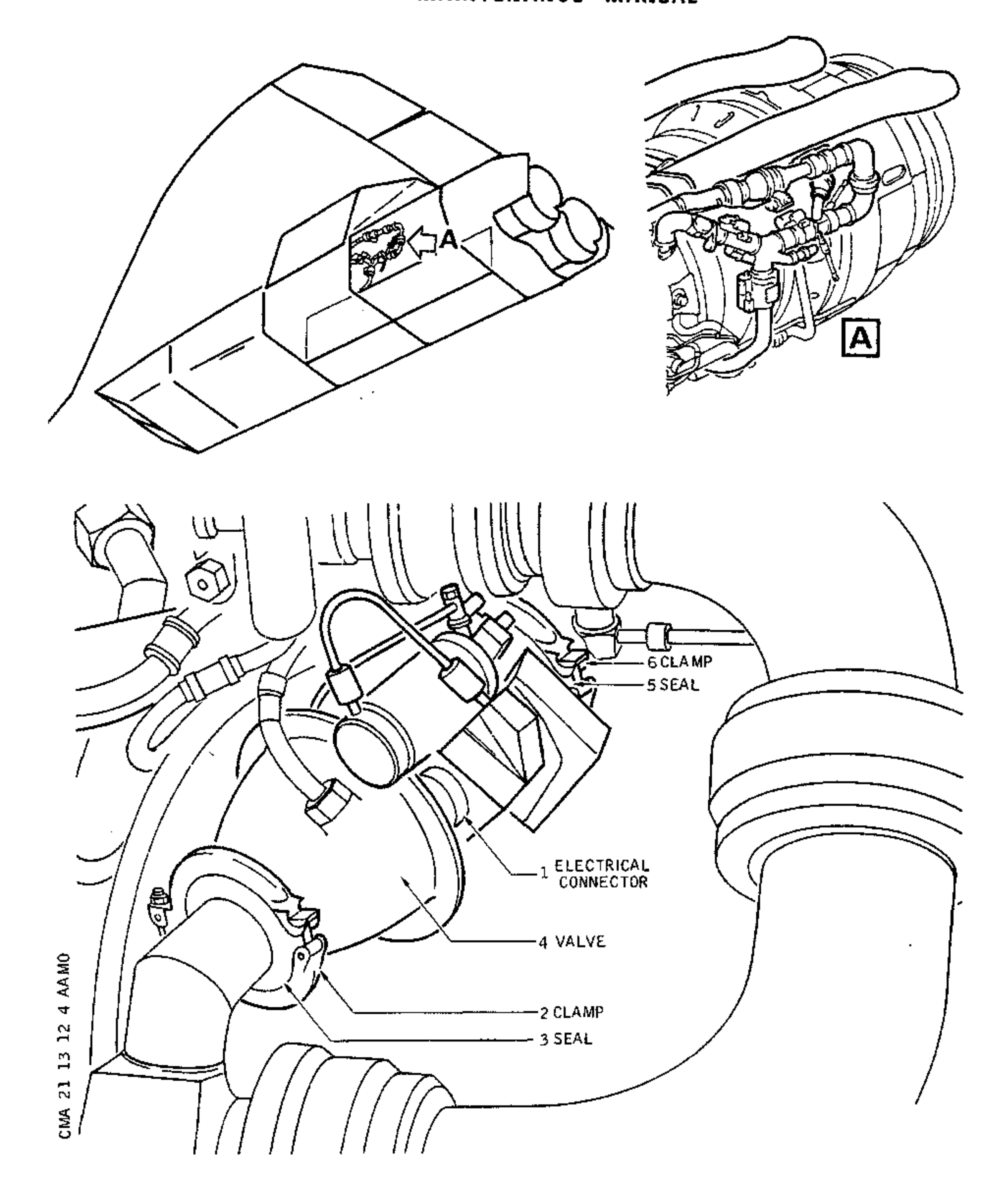
R Refer 21-13-12, Adjustment/Test.

R F. Close-Up

(1) Close access doors.

(2) Remove access platform.

(3) Remove safety clip and tag and reset the circuit breaker tripped in paragraph 2. B. (1).



R

Ejector Control Valve
Figure 401

EJECTOR CONTROL VALVE - ADJUSTMENT/TEST

1. General

The purpose of this test is to check the ejector control valve for evidence of leakage and security of attachment. This operation covers the four ejector control valves.

2. Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Ground Air Supply Unit : - Relative Minimum Pressure - 2 bars, airflow 0.4 kg/sec. - Relative Maximum Pressure - 4.5 bars, airflow 0.6 kg/sec. - Temperature must not exceed 300°C	
R Circuit Breaker Safety Clips	

B. Prepare

R (1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, S).

R (2) Connect ground air supply unit and pressurize the aircraft.

R (3) On AIR BLEED CONTROL panel 2-214, check that BLEED VALVE and CROSS BLEED switches are in SHUT position and that COND VALVE switch is in OFF position.

R (4) Pressurize Fuel System

R WARNING : OBSERVE FUEL SYSTEM SAFETY PRECAUTIONS
R DESCRIBED IN 28-00-00 AND 28-10-00.

R NOTE : Pressurization assumes a minimum quantity of
R fuel of 2500 kg in the appropriate feed tank (1,
R 2, 3, 4).
R On centre console, place throttle control levers
R in SHUT position (lower mechanical stop).
R Check that crossfeed valves are closed and that

associated magnetic indicators display vertical stripes.
With the LP VALVE switch locked at OPEN by the switch guard, check that the associated magnetic indicator shows an in-line indication.
Place the first of the three ENGINE FEED PUMPS control switches in ON position (MAIN PUMP)
Engine 1 Main Fuel Pump for group 1
Engine 2 Main Fuel Pump for group 2
Engine 3 Main Fuel Pump for group 3
Engine 4 Main Fuel Pump for group 4
Check that corresponding LOW PRESS indicator light goes off when pump operating pressure is reached.

WARNING : FUEL SYSTEM MUST NOT OPERATE MORE THAN 2 HOURS.

In case Fuel System cannot be used.

Trip, safety and tag the following circuit breakers

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
For GRP 1			
LH.UC WEIGHT SW A SYS SUP	1-213	G 292	M17
For GRP 2			
LH.UC WEIGHT SW B SYS SUP	3-213	G 293	B 8
For GRP 3			
RH.UC WEIGHT SW B SYS SUP	3-213	G 294	B 9
For GRP 4			
RH.UC WEIGHT SW A SYS SUP	1-213	G 295	M18

WARNING : DURING TEST, FUEL EXCH WARNING LIGHT MAY ILLUMINATE. ON PANEL 2-214 PLACE FUEL VALVE SWITCH IN OPEN POSITION (SELF-HOLDING CANCELLATION).

(5) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GR1 AIR GEN COND AND IND	1-213	1H 862	D13
GR2 AIR GEN COND AND IND	5-213	2H 862	F 9
GR3 AIR GEN COND AND IND	15-215	3H 862	B 3
GR4 AIR GEN COND AND IND	15-216	4H 862	B23

C. Test

R On AIR BLEED CONTROL panel 2-214, place CROSS BLEED switch in OPEN position.

CROSS BLEED magnetic indicator displays a horizontal stri-
R pe. Pressure value increases at pressure gage.

COND VALVE switch is in ON position.
Wait for a while ; the air conditioning valve must open.
Check that it opens at COND VALVE magnetic indicator which displays a vertical stripe.
On TEMPERATURE CONTROL panel MASS FLOW indicator indicates that airflow increases.
JET PUMP magnetic indicator must display a horizontal stripe.
Check for leakage at level of ejector control valve attachment clamps in engine nacelle :

Door 415CL for GR1
Door 426CR for GR2
Door 435CL for GR3
Door 446CR for GR4

Trip circuit breaker G 293 for groups 1 and 2 and G 295 for groups 3 and 4.
The ejector control valve closes, JET PUMP magnetic indicator displays a vertical stripe.
Reset circuit breaker G 293 for group 1 and 2 and G 295 for groups 3 and 4 ; JET PUMP magnetic indicator displays a horizontal stripe.

On AIR BLEED CONTROL panel, place COND VALVE switch in OFF position.
COND VALVE magnetic indicator displays a horizontal stripe.
JET PUMP magnetic indicator displays a vertical stripe.
Reading must be 0 on MASS FLOW flow indicator.

Place CROSS BLEED switch in SHUT position ; CROSSBLEED magnetic indicator displays a vertical stripe.

D. Close-Up

R (1) In case the Fuel system has been pressurized.

R Place ENGINE FEED PUMP switch in OFF position. After a
R few seconds the corresponding LOW PRESS indicator light
R must illuminate.

R If necessary, remove safety clip and tag and reset
R circuit breaker tripped in paragraph 3.B.(4).
R If FUEL EXCH warning has come on during test after
R switching off the ground air supply unit, wait for
R cancellation of warning and place FUEL VALVE switch
R in AUTO position.

R (2) De-energize the aircraft electrical network and dis-
R connect electrical ground power unit.

R (3) Shut down ground air supply unit and disconnect it.

PRIMARY HEAT EXCHANGER EJECTOR - REMOVAL/INSTALLATION

1. General

R The heat exchanger ejector removal procedure is identical for each air conditioning unit.

2. Primary Heat Exchanger Ejectors

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 1.8 m (5 ft. 11 in.)	

B. Prepare

(1) Open access doors
R 415AL for removal of group 1 ejectors
R 426AR for removal of group 2 ejectors
R 435AL for removal of group 3 ejectors
R 446AR for removal of group 4 ejectors

C. Remove

(1) Remove clamp (1).

(2) Remove screws (2) and union (3).

(3) Remove screws (4).

(4) Remove ejector (5).

(5) Discard seals (6) and (7).

D. Install

(1) Install ejector (5) fitted with a new seal (6) at its end (8).

NOTE : The ejectors are directed rearwards.

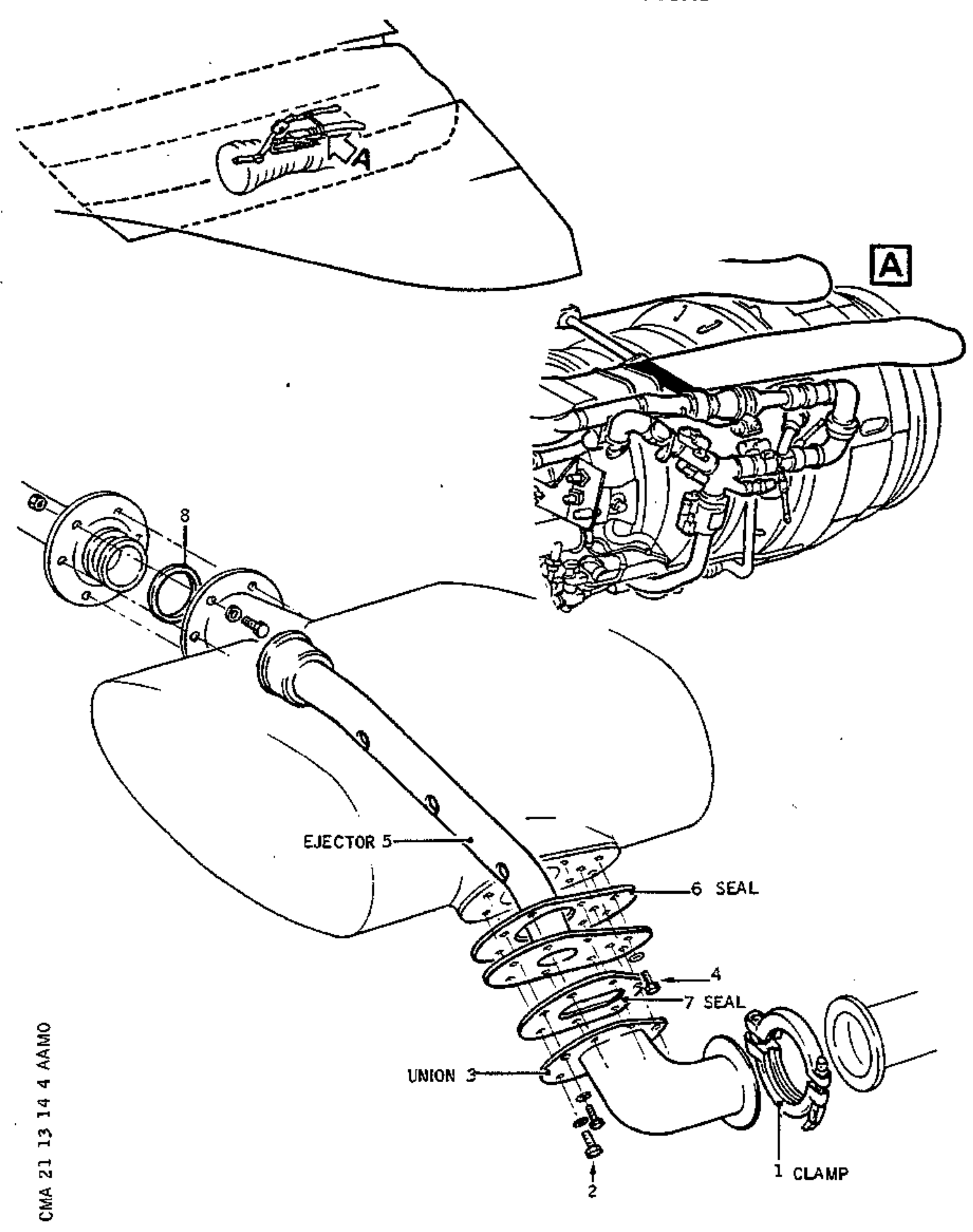
(2) Install screws (4).

(3) Install union (3) fitted with a new seal (7). Attach with screws (2).

(4) Install clamp (1).

E. Close-Up

Close access doors



R Primary Heat Exchanger Ejectors
Figure 401

SECONDARY HEAT EXCHANGER EJECTOR - REMOVAL/INSTALLATION

1. General

The removal/installation operation is identical for the air jet pump of each air conditioning group.

2. Secondary Heat Exchanger Air Jet Pump

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 1.8 m (5 ft. 11 in.)	

B. Prepare

(1) Remove engine (Ref. Chapter 71-00-00)

(2) Position access platform

C. Remove (Ref. Fig. 401)

(1) Remove screws (1) and retainers (2)

(2) Remove tube (3) from flange type couplings

(3) Remove screws (4)

(4) Remove ejector (5)

(5) Discard seal (6)

D. Install

(1) Install ejector (5) fitted with a new seal (6)

NOTE : The ejector is directed rearwards

(2) Install screws (4)

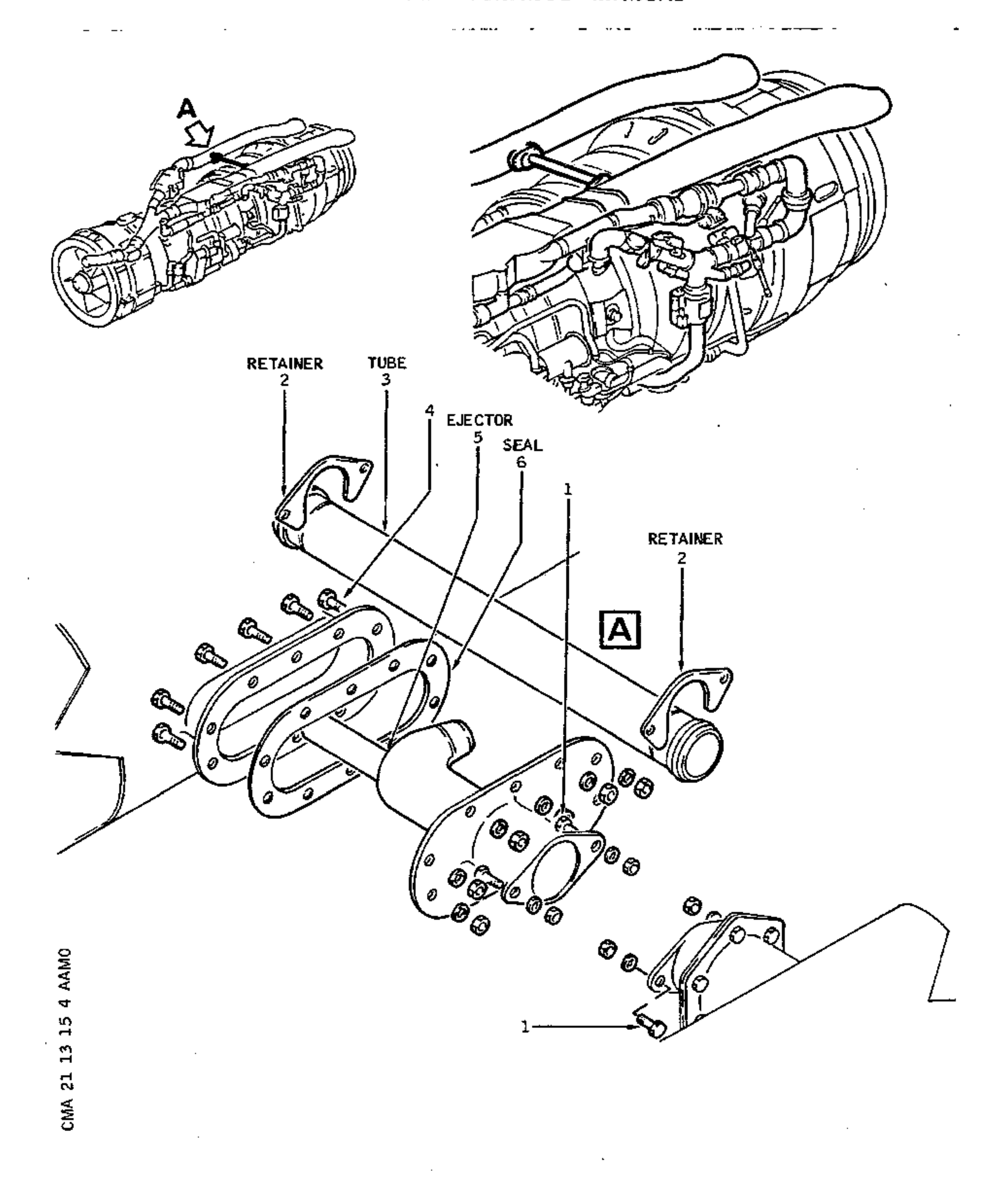
(3) Install tube (3) in flange type couplings

(4) Install retainers (2) with screws (1)

E. Close-Up

(1) Remove access platform

(2) Install engine



Secondary Heat Exchanger Ejector
Figure 401

CHANGEOVER VALVE - REMOVAL/INSTALLATION

1. General

The removal/installation operation is identical for the changeover valves of each group. The valves are located on RH side of engine bays 2 and 4, and on LH side of engine bays 1 and 3.

2. Changeover Valve

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 1.8 m (5 ft. 11 in.)	

B. Prepare

(1) Position access platform at nacelle.

(2) Open access doors :

415AL for removal/installation of Group 1 valve
426AR for removal/installation of Group 2 valve
435AL for removal/installation of Group 3 valve
446AR for removal/installation of Group 4 valve

C. Remove (Ref. Fig. 401)

(1) Remove clamps (1) and (2).

(2) Remove screws (3).

(3) Push sleeve (4) backwards to allow changeover valve to be disengaged.

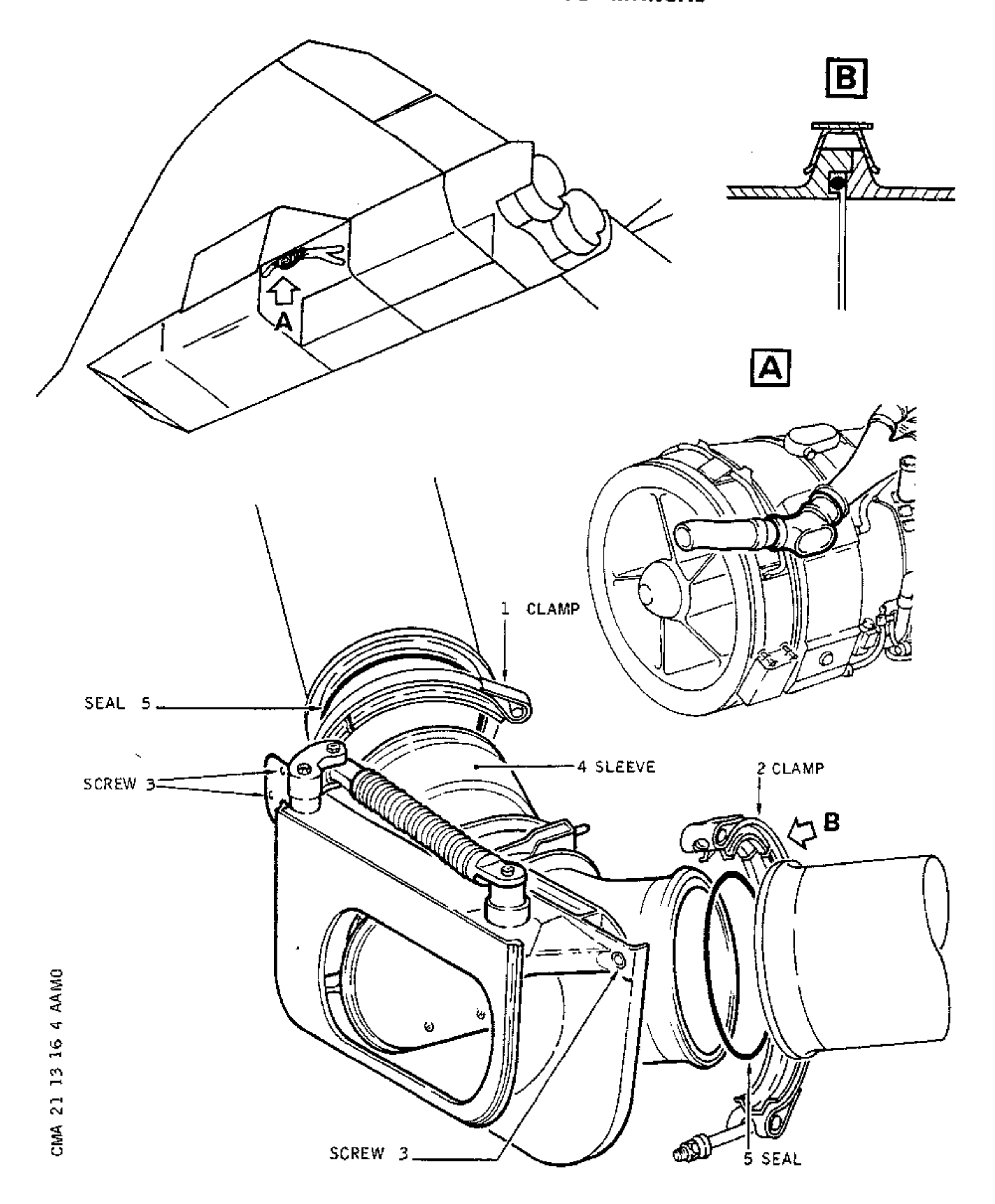
(4) Remove changeover valve by releasing it from centering pin.

R (5) Check condition of seals (5); discard them if ne-
R cessary.

D. Install

R (1) Install new seals if necessary; install changeover val-
R ve by engaging it on centering pin.

(2) Install screws (3).



Changeover Valve
Figure 401

(3) Push back sleeve (4) onto "ram air" line.

(4) Install clamps (1) and (2).

(5) CAUTION
(Ref. Fig. 401)
CHECK THAT CLAMP B DOES NOT FOUL ENGINE OIL TANK.
R IF A FOUL DOES EXIST, REPOSITIONING OF CLAMP WILL BE NECESSARY TO OBTAIN MAXIMUM CLEARANCE BETWEEN THE ENGINE OIL TANK AND THE CLAMP. BECAUSE OF DIFFERENT GEOMETRY IN THE OTHER BAYS, THIS PROBLEM CAN ONLY EXIST IN BAY 3.

E. Close-Up

(1) Close access door.

(2) Remove access platform.

R FIRE VALVE - REMOVAL/INSTALLATION

1. General

R The removal/installation procedure of the four fire valves, one of which is fitted in each of the air conditioning groups, is identical. The valve is located in the LH side of nacelles 1 and 3, and in the RH side of nacelles 2 and 4.

R The fire valve will be delivered from the servicing bay with the actuator assembly loosely installed only and must be adjusted after installation.

R The union of the fire extinguisher pipe must be connected to the actuator, the lock nut of the actuator correctly torque-tightened and the tab washer used to lock the nut in position, before the union of the fire extinguisher pipe is finally tightened. The setting of the actuator is then checked and adjusted if required.

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED IN 24-00-00.

R 2. Fire Valve

A. Equipment and Materials

DESCRIPTION	PART NO.
Access platform 5 ft 11 in (1.8 m)	-
General lubricants (Ref. 20-30-00, product No. 51)	-
Lockwire - dia. 0.028 in (0.7 mm)	-
Circuit breaker safety clips (Ref. WDM 20-44-16, Page 201)	PM 81128

B. Prepare

(1) Install access platform to gain access to the nacelle.

(2) Open the necessary engine bay access door, as follows:
415AL - for access to No. 1 fire valve.
426AR - for access to No. 2 fire valve.
435AL - for access to No. 3 fire valve.
446AR - for access to No. 4 fire valve.
(Ref. 71-00-00, Servicing).

R (3) Trip, safety and tag the appropriate circuit breakers for the engine bay that you are working in:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 1 & 4 FIRE EXT SHOT 1 SUP	1-213	W 61	N19
ENG 2 & 3 FIRE EXT SHOT 1 SUP		W 62	N20
ENG 2 & 3 FIRE EXT TEST SUP	15-215	W 66	A 1
ENG 1 & 4 FIRE EXT TEST SUP	15-216	W 65	A27
ENG 1 & 4 FIRE EXT SHOT 2 SUP		W 63	C26
ENG 2 & 3 FIRE EXT SHOT 2 SUP		W 64	D26

C. Remove (Ref. Fig. 401)

R (1) Disconnect the fire extinguisher pipe (1) from the actuator (2). Fit a blank to the open pipe end and to the actuator connection.

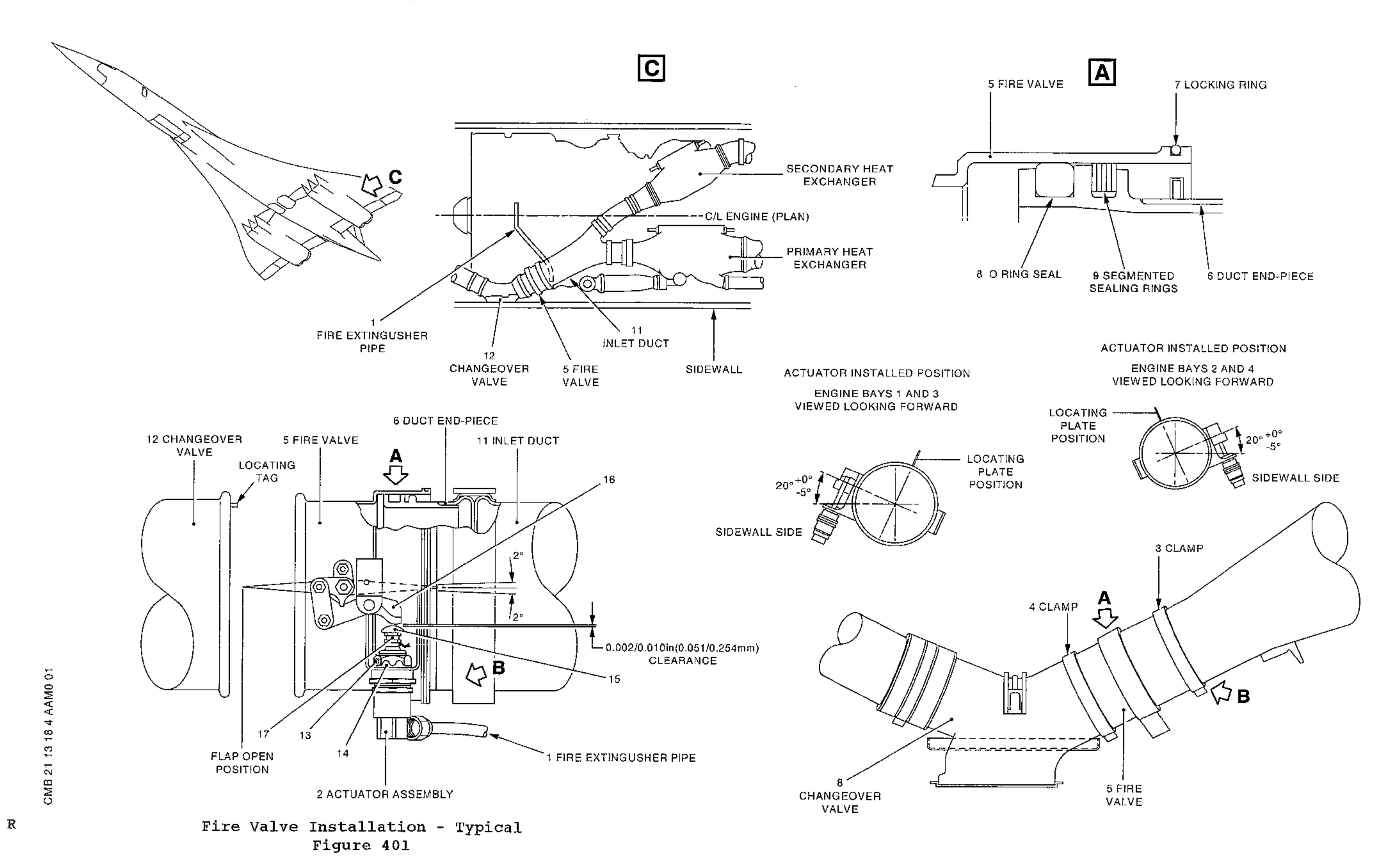
R (2) Remove and retain the clamps (3) and (4).

R (3) Hand compress the fire valve (5) against the duct end-piece (6), and remove the fire valve (5), complete with duct end-piece (6). Cap the open ducts.

R (4) Remove and retain, the locking ring (7).

R (5) Withdraw the duct end-piece (6) from the fire valve assembly (5).

R (6) Clean the duct end-piece (6), discard the 'O'-ring seal (8), and examine the segmented sealing rings (9). Retain the duct end-piece (6) assembly and segmented sealing rings (9) for fitment to the replacement fire valve.



R

Fire Valve Installation - Typical
Figure 401

R D. Preparation of the Replacement Component

R (1) Using product No. 51, smear:

R - the inner face of the replacement fire valve
R assembly, where the duct end-piece is installed.
R - the 'O'-ring seal (8) and the segmented sealing
R rings (9) of the duct end-piece (6).

R (2) Install the duct end-piece (6) to the replacement fire
R valve (5).

R NOTE: Make sure that the joints of each of the
R segmented sealing rings are displaced by
R approximately 72 degrees from each other when
R installing the duct end-piece. This is to
R form a seal.

R (3) Install locking ring (7) to lock the duct end-piece
R (6) to the fire valve (5).

R (4) Make sure there is at least four degrees of angular
R movement, that is two degrees either side of the
R centre-line, of the duct end-piece (6) when it is
R correctly installed in the fire valve (5).

R E. Install (Ref. Fig. 401)

R (1) Remove all blanking caps from the ducts and the
R replacement fire valve ducts.

R (2) Install the fire valve (5) and duct end-piece (6)
R assembly to the duct (11), and fit clamp (3).

R (3) Extend the fire valve (5) on the duct end-piece (6),
R until the fire valve makes contact with the changeover
R valve (12).

R (4) Fit clamp (4) to the joint between the changeover
R valve (12) and the fire valve (5).

R NOTE: Make certain that the contact flanges are
R correctly aligned, with the locator of the
R changeover valve correctly engaged in the
R locating plate of the fire valve.

R (5) Torque-tighten clamps (3) and (4) to between 50 and 70
R lbf in (0.565 to 0.791 mdaN).

R (6) At the fire valve actuator:

R (a) Remove the blank.

R (b) Align the actuator (2) with the installed
R position of the fire extinguisher pipe (1).

R (c) Hand tighten the fire extinguisher pipe
R connection.

R (d) Torque-tighten the actuator securing nut (13) to
R 240 lbf in (2.712 mdaN), and lock in this
R position with tabwasher (14).

R (e) Torque-tighten the fire extinguisher pipe
R connection (1) to between 160 and 180 lbf in
R (1.978 and 2.204 mdaN).

R (f) Check the clearance between the actuator screw
R (15) and the latch (16) is between 0.002 and
R 0.010 in (0.051 to 0.254 mm), adjust as
R necessary. Torque-tighten the nut (17) to
R 25 lbf in (0.282 mdaN) and wire lock.

R F. Test

R (1) Test in accordance with 26-21-00, Adjustment/Test,
R Section 5 - Fire Valve Functional Test.

R G. Close-Up

R (1) Make certain that the working area is clean and clear
R of tools and miscellaneous equipment.

R (2) Close the engine access door (Ref. 71-00-00,
R Servicing).

R (3) Remove the access platform.

R (4) Remove safety clips and reset the circuit breakers
R previously tripped.

FUEL CONTROL VALVE - REMOVAL/INSTALLATION

1. General

The removal/installation procedure of fuel control valves is identical for each group.

2. Fuel Control Valve

A. Equipment and Materials

DESCRIPTION	PART NO.
A Fuel Container 0.5 l (1 pint, approximately)	
Circuit Breaker Safety Clips	
Electrical Ground Power Unit	

B. Prepare

(1) Trip, safety and tag the following circuit breakers :

Group 1

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 TEMP SELECTOR AUTO SUP & CONT	2-213	H1000	B17
GRP1 FUEL VALVE CONT		1H 863	D16

Group 2

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP2 TEMP SELECTOR AUTO SUP & CONT	4-213	H1001	E11
GRP2 FUEL VALVE CONT		2H 863	E12

Group 3

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP3 TEMP SELECTOR AUTO SUP & CONT	2-213	H1002	G16
GRP3 FUEL VALVE CONT		3H 863	F16

Group 4

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP4 TEMP SELECTOR AUTO SUP & CONT	4-213	H1003	B12
GRP4 FUEL VALVE CONT		4H 863	B11

R (2) Connect the electrical ground power unit and energize
R the aircraft electrical network (Ref. 24-41-00,
R Servicing).

R (3) In flight compartment, on FUEL MANAGEMENT Flight Engineer's panel, place LP VALVE switch corresponding to the valve to be removed in SHUT 2 position.

(4) On wing, open access door :
532CT for group 1 valve
531BT for group 2 valve
631BT for group 3 valve
632CT for group 4 valve.

C. Remove (Ref. Fig. 401)

(1) Place fuel container under the valve.

(2) Disconnect electrical connector (4).

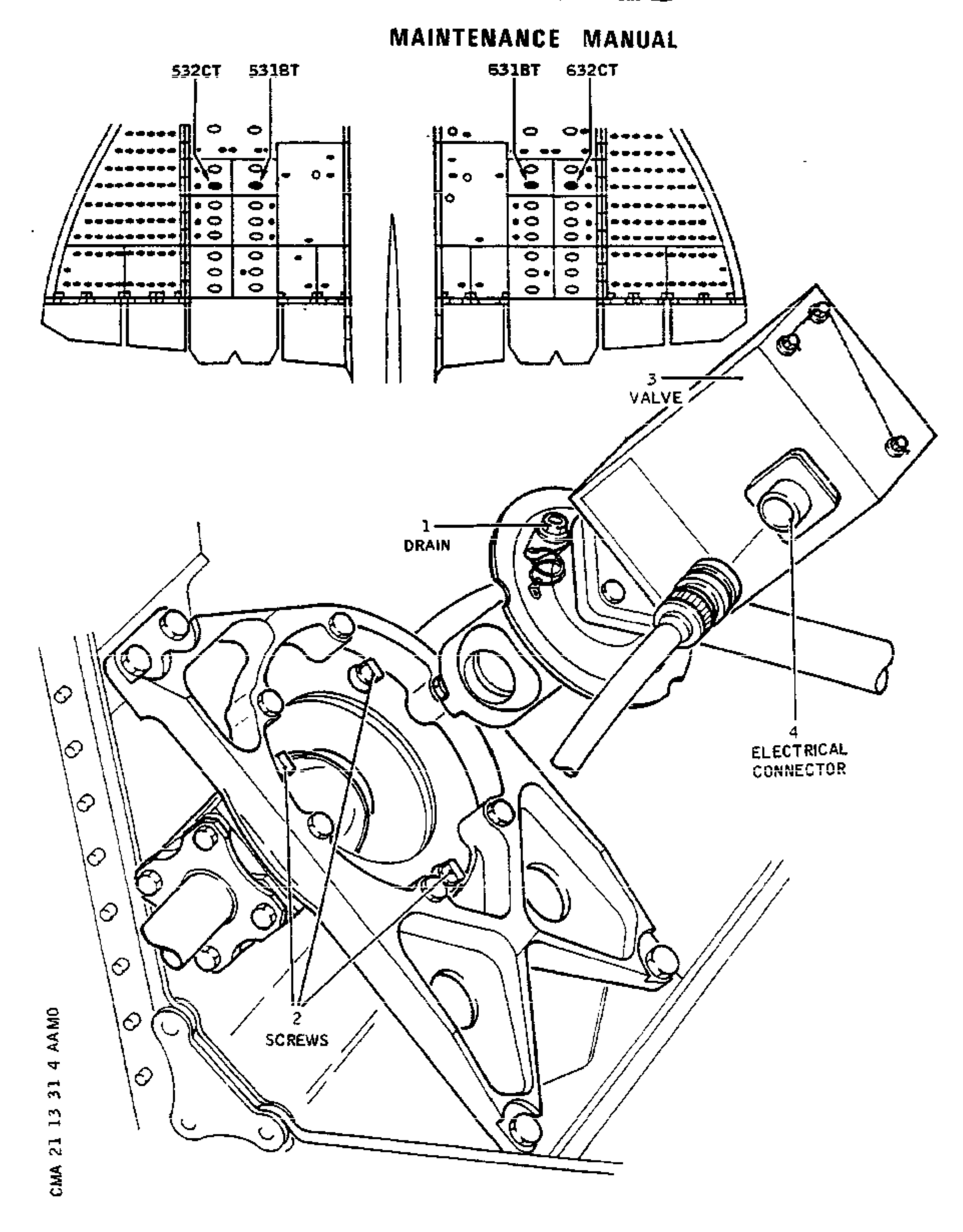
(3) Open drain (1) and drain the valve.

(4) Loosen screws (2) attaching the valve.

R (5) Rotate the valve (3) clockwise a quarter of a turn and remove it.

D. Install

(1) Make certain that the replacement valve (3) is clean.



Fuel Control Valve
Figure 401

R

(2) Install the valve, rotate it counterclockwise by a quarter turn.

(3) Tighten attaching screws (2).

(4) Connect electrical connector (4).

(5) Remove fuel container; clean working area.

RB (6) Test in accordance with MM 21-13-31, Adjustment/Test,
RB Page Block 500.

RB E. Close Up

(1) Close access door.

(2) In flight compartment, on FUEL MANAGEMENT Flight Engineer's panel, place LP VALVE switch to OPEN position.

(3) De-energize the aircraft electrical network and disconnect electrical ground power unit.

R FUEL CONTROL VALVE - ADJUSTMENT/TEST

1. General

R The purpose of this test is to check the fuel control valve for evidence of leakage and security of attachment after a removal/installation operation.
R This operation covers the four fuel control valves.

2. Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	

B. Prepare

(1) Connect electrical ground power unit and energize the
R aircraft electrical network (Ref. 24-41-00, Servicing).

(2) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 FUEL VALVE CONT	2-213	1H 863	D16
GRP2 FUEL VALVE CONT	4-213	2H 863	E12
GRP3 FUEL VALVE CONT	2-213	3H 863	F16
GRP4 FUEL VALVE CONT	4-213	4H 863	B11
GRP1 TEMP SELECTOR AUTO SUP AND CONT	2-213	H1000	B17
GRP2 TEMP SELECTOR AUTO SUP AND CONT	4-213	H1001	E11
GRP3 TEMP SELECTOR AUTO SUP AND CONT	2-213	H1002	G16
GRP4 TEMP SELECTOR AUTO SUP AND CONT	4-213	H1003	B12

(3) On panel 2-214 FUEL VALVE switch must be in SHUT position (Ref. Chapter 28).

(4) Pressurize fuel system

WARNING : OBSERVE FUEL SYSTEM SAFETY PRECAUTIONS DESCRIBED IN 28-00-00 AND 28-10-00.

NOTE : Pressurization assumes a minimum quantity of fuel of 2500 kg in the appropriate feed tank (1, 2, 3, 4).
On centre console, place control control levers in SHUT position (lower mechanical stop).
Check that crossfeed valves are closed and that associated magnetic indicators display vertical stripes.
With the LP VALVE switch locked at OPEN by the switch guard, check that the associated magnetic indicator shows an in-line indication.
Place the first of the three ENGINE FEED PUMPS control switches in ON position (MAIN PUMP).
Engine 1 Main Fuel Pump for group 1
Engine 2 Main Fuel Pump for group 2
Engine 3 Main Fuel Pump for group 3
Engine 4 Main Fuel Pump for group 4

Check that corresponding LOW PRESS indicator light goes off when pump operating pressure is reached.

WARNING : FUEL SYSTEM MUST NOT OPERATE MORE THAN 2 HOURS.

C. Test

(1) On wing upper surface open access doors :

CT for GR1 on LH wing
BT for GR2 on LH wing
BT for GR3 on RH wing
CT for GR4 on RH wing.

(2) Check that manual control lever is in correct position.
R Check for fuel leakage at level of fuel control valve.

(3) On panel 2-214, place FUEL VALVE switch in OPEN position.
FUEL VALVE magnetic indicator must display a horizontal stripe.

R (4) On fuel control valve, check that manual control
R lever moves, which indicates that fuel control valve is slaved to its motor.
R Check for evidence of leakage at level of fuel control valve.

(5) Place FUEL VALVE switch in OFF position.
FUEL VALVE magnetic indicator displays a vertical stripe.
R Check that manual control lever moves on fuel control valve.

D. Close-Up

(1) Close the corresponding access door on wing.

R (2) Place ENGINE FEED PUMP switch in OFF position.
After a few seconds the corresponding LOW PRESS indicator light must illuminate.

(3) De-energize the aircraft electrical network and disconnect electrical ground power unit.

FUEL HEAT EXCHANGER INLET TEMPERATURE SENSOR REMOVAL/INSTALLATION

1. General

The removal/installation procedure is identical for the temperature sensors of groups 1 and 4, and 2 and 3.

2. Temperature Sensor

A. Equipment and Materials.

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Access Platform	

B. Prepare

(1) Open access doors

532 AT for group 1 temperature sensor
531 AT for group 2 temperature sensor
631 AT for group 3 temperature sensor
632 AT for group 4 temperature sensor

R (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1			
GR1 FUEL VALVE CONT	2-213	1H 863	D16
TEMP SELECTOR AUTO SUP AND CONT		H1000	B17
Group 2			
GR2 FUEL VALVE CONT	4-213	2H 863	E12
GR2 TEMP SELECTOR AUTO SUP AND CONT		H1001	E11
Group 3			
GR3 FUEL VALVE CONT	2-213	3H 863	F16
GR3 TEMP SELECTOR AUTO SUP AND CONT		H1002	G16

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 4			
GR4 FUEL VALVE CONT	4-213	4H 863	B11
GR4 TEMP SELECTOR AUTO SUP AND CONT		H1003	B12

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1)

(2) Remove screws (2)

(3) Remove temperature sensor (3)

D. Install

(1) Install temperature Sensor (3)

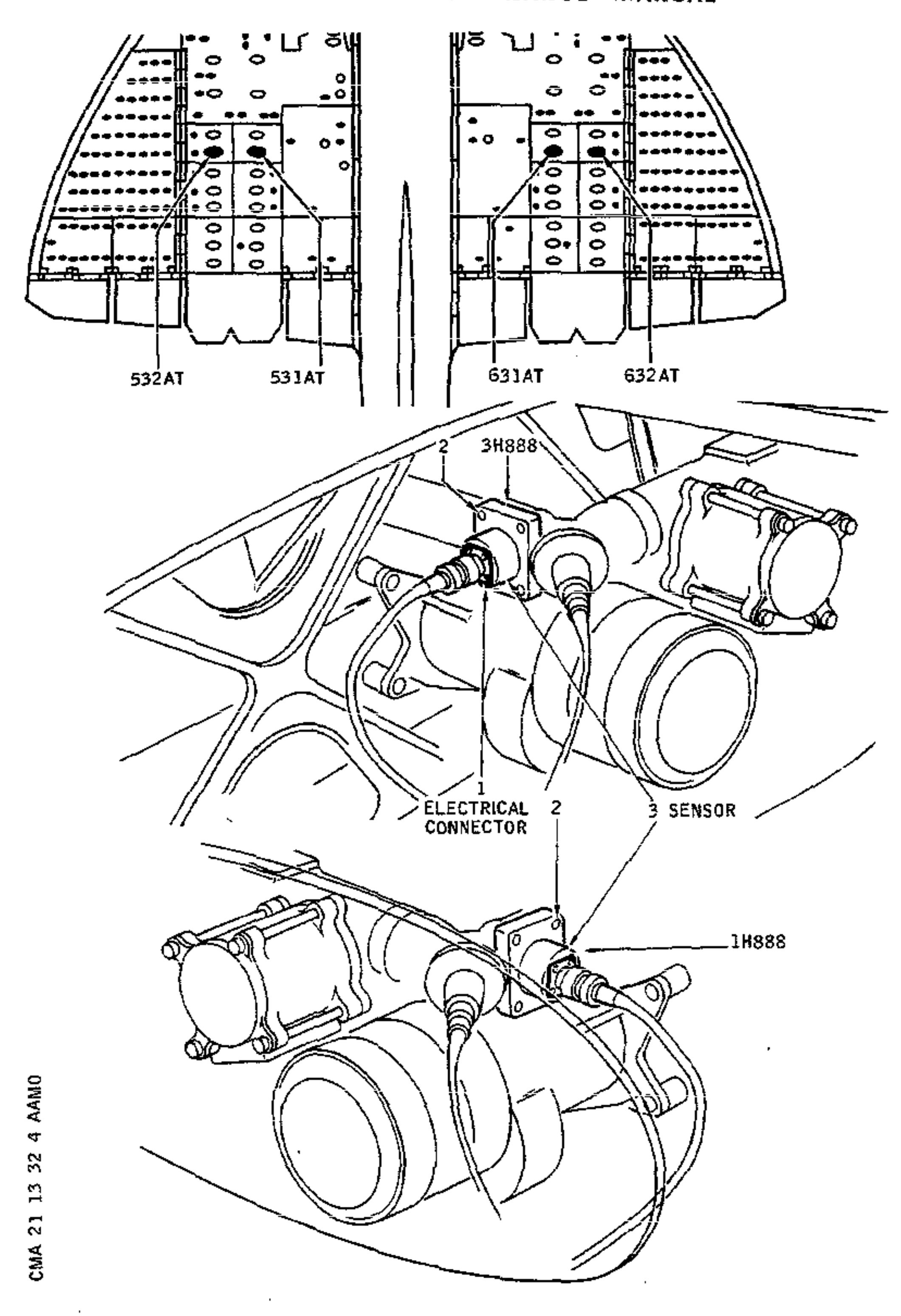
(2) Install screws (2)

(3) Connect electrical connector (1)

E. Close Up

(1) Close access doors

R (2) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2 B (2).



Fuel Heat Exchanger Temperature Sensor.
Figure 401

R

FUEL HEAT EXCHANGER AIR INLET TEMPERATURE SENSOR REMOVAL/INSTALLATION

1. General

The removal/installation procedure is identical for the temperature sensors of each group.

2. Fuel Heat Exchanger Air Inlet Temperature Sensor

A. Equipment and materials.

DESCRIPTION	PART NO.
Circuit breaker Safety Clips	
Access platform	

B. Prepare

(1) Open access doors

534 AT for group 1 temperature sensor
533 BT for group 2 temperature Sensor
633 BT for group 3 temperature Sensor
634 AT for group 4 temperature Sensor

(2) Trip safety and tag the following circuit breakers

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1			
GR1 FUEL VALVE CONT	2-213	1H 863	D16
GR1 TEMP SELECTOR AUTO SUP AND CONT		H1000	B17
Group 2			
GR2 FUEL VALVE CONT	4-213	2H 863	E12
GR2 TEMP SELECTOR AUTO SUP AND CONT		H1001	E11
Group 3			
GR3 FUEL VALVE CONT	2-213	3H 863	F16
GR3 TEMP SELECTOR AUTO SUP AND CONT		H1002	G16

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 4			
GR4 FUEL VALVE CONT	4-213	4H 863	B11
GR4 TEMP SELECTOR AUTO SUP AND CONT		H1003	B12

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1)

(2) Remove screws (2)

(3) Remove temperature Sensor (3)

D. Install

(1) Install temperature Sensor (3)

(2) Install screws (2)

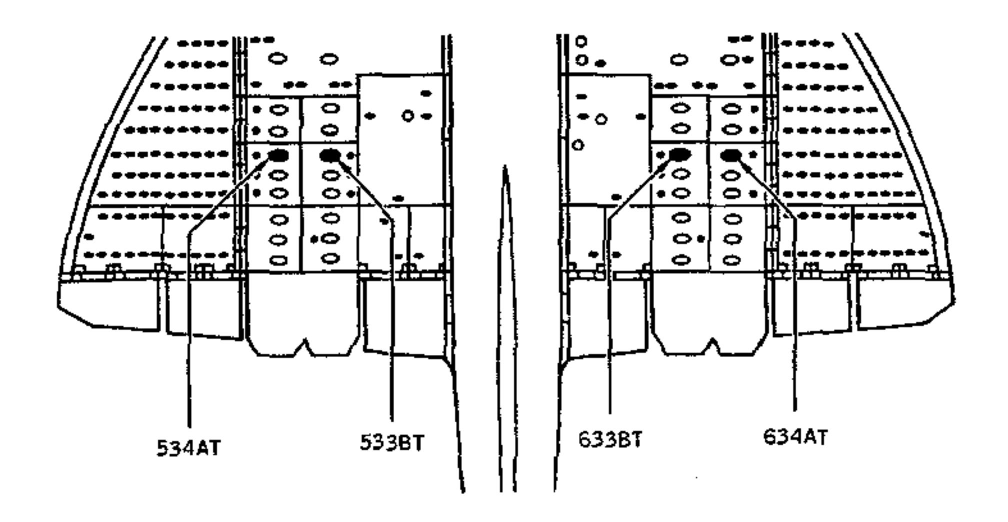
(3) Connect electrical connector (1)

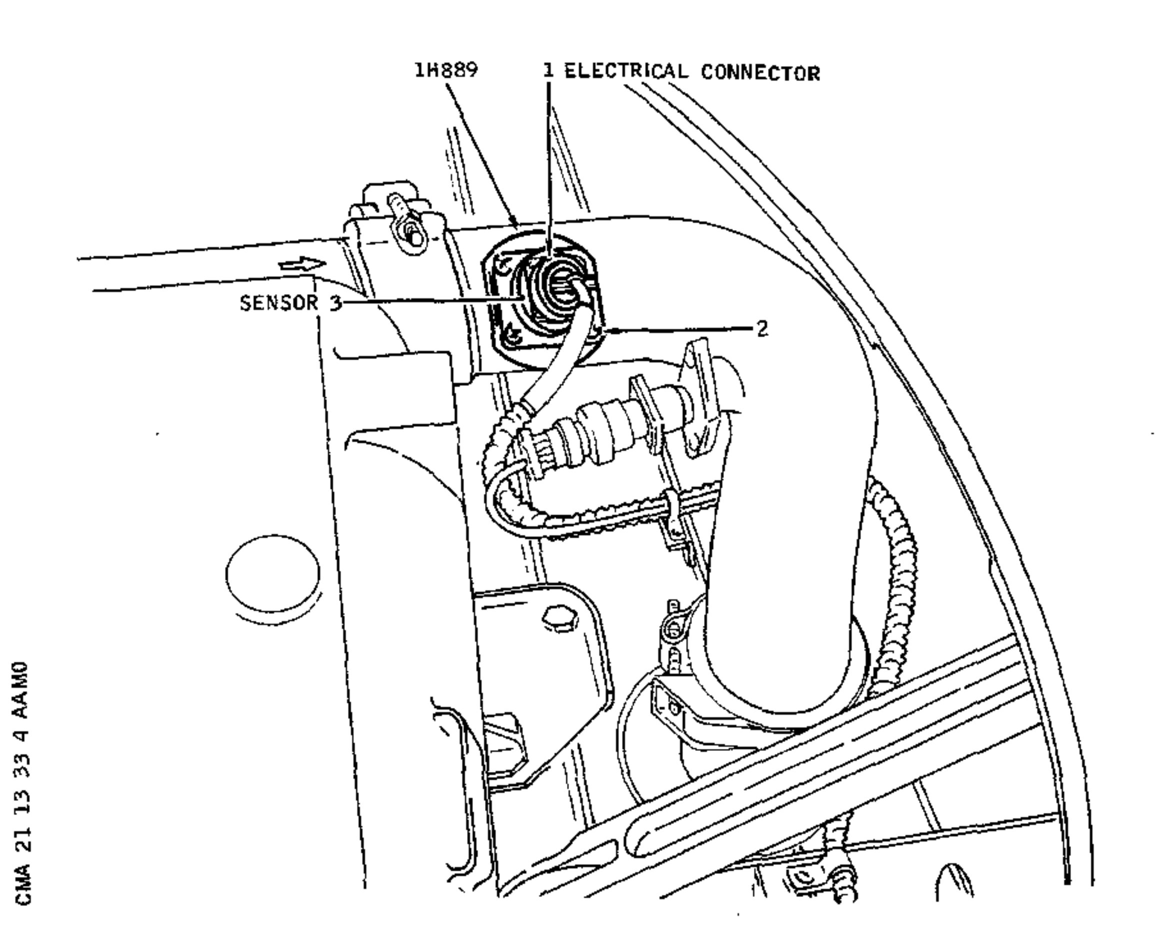
E. Close Up

(1) Close access doors

(2) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2 B (2).

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Fuel Heat Exchanger Air Inlet Temperature Sensor
Figure 401

R

TURBINE AIR INLET OVERTEMPERATURE DETECTOR
REMOVAL/INSTALLATION

1. General

The removal/installation procedure for overtemperature detectors is identical for each group.

2. Turbine Air Inlet Overtemperature Detector

A. Equipment and Materials.

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Access Platform	

B. Prepare

(1) Open access doors

R 534 AT for group 1 overtemperature detector (1H656)
R 533 BT for group 2 overtemperature detector (2H656)
R 633 BT for group 3 overtemperature detector (3H656)
R 634 AT for group 4 overtemperature detector (4H656)

(2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1			
GR1 FUEL VALVE CONT	2-213	1H 863	D16
AIR/COND VALVE CLOSE & AIR GEN IND	1-213	1H 612	D11
Group 2			
GR2/FUEL VALVE CONT	4-213	2H 863	E12
AIR/COND VALVE & AIR GEN IND	5-213	2H 612	A 9
Group 3			
GR3/FUEL VALVE CONT	2-213	2H 863	F16

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
AIR/COND VALVE & AIR GEN IND	15-215	3H 612	A 3
Group 4			
GR4/FUEL VALVE CONT	4-213	4H 863	B11
AIR/COND VALVE & AIR GEN IND	15-216	4H 612	A24

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1)

(2) Remove screws (2)

(3) Remove Overtemperature detector (3).

D. Install

(1) Install overtemperature detector (3)

(2) Install screws (2)

(3) Connect electrical connector (1)

B E. Close Up

B (1) Close access doors

B (2) Remove safety clips and tags and reset the circuit
B breakers tripped in paragraph 2 B (2).

B F. Test

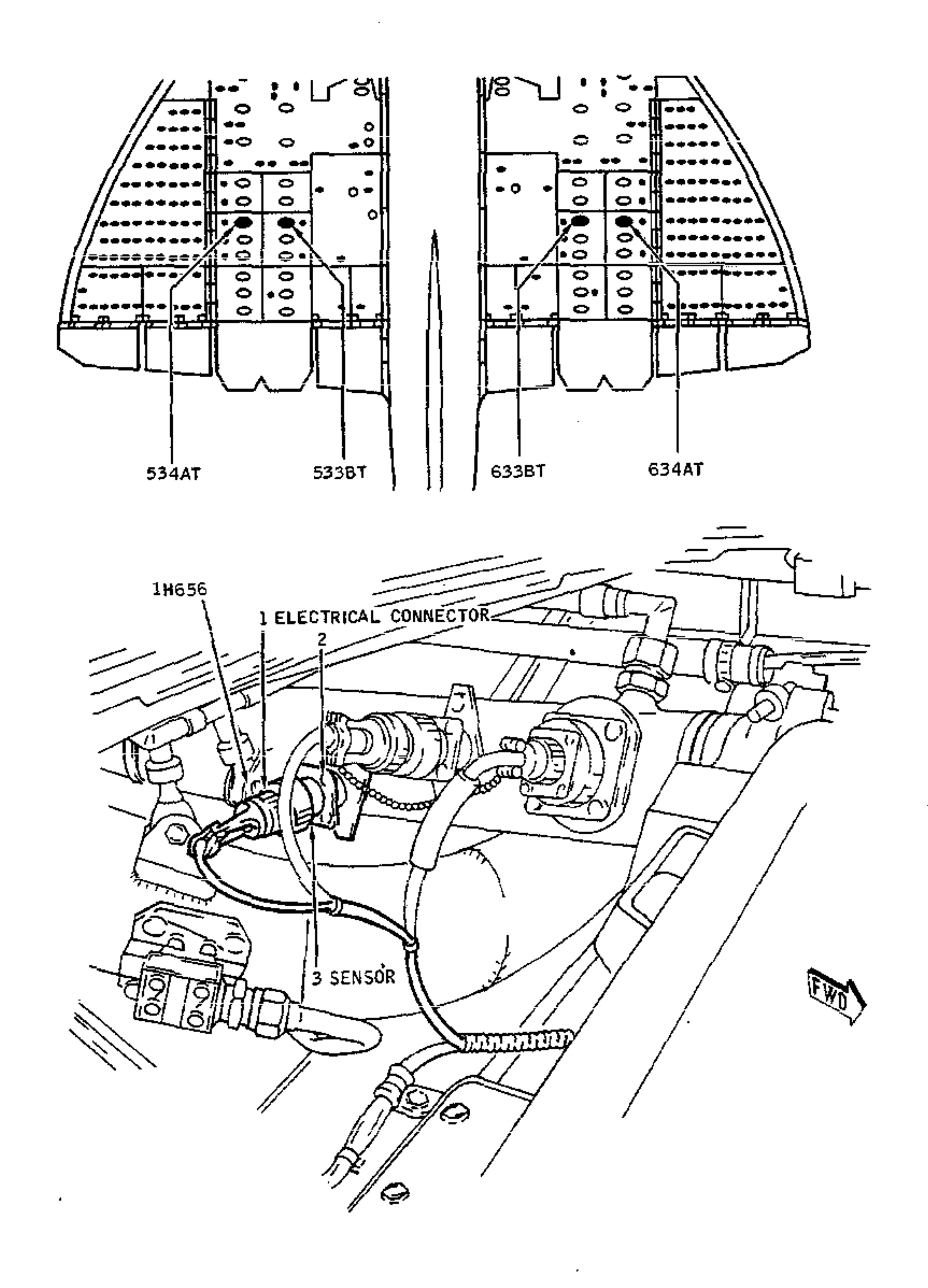
B Carry out the following test procedure (Reference 21-10-00
B ADJUSTMENT/TEST).

B (1) Operation Test - Indicator Light Test.

B (2) Operational Test of Warning Indicators

B (a) Fuel Overheat Test

B (b) Close-up.



CMA 21 13 34 4 AAMO

R Turbine Air Inlet Overtemperature Detector
Figure 401

R FUEL HEAT EXCHANGER AIR OUTLET TEMPERATURE SENSOR REMOVAL/INSTALLATION

1. General

R The removal/installation procedure of fuel heat exchanger air outlet temperature sensor is identical for each group.

R 2. Fuel Heat Exchanger Air Outlet Temperature Sensor

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Access Platform	

B. Prepare

(1) Open access doors

R 534 AT for group 1 temperature sensor
R 533 BT for group 2 temperature sensor
R 633 BT for group 3 temperature sensor
R 634 AT for group 4 temperature sensor

R (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1			
GR1 FUEL VALVE CONT	2-213	1H 863	D16
GR1 TEMP SELECTOR AUTO SUP AND CONT		H1000	B17
Group 2			
GR2 FUEL VALVE CONT	4-213	2H 863	E12
GR2 TEMP SELECTOR AUTO SUP AND CONT		H1001	E11
Group 3			
GR3 FUEL VALVE CONT	2-213	3H 863	G16
GR3 TEMP SELECTOR AUTO SUP AND CONT		H1002	G16

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 4			
GR4 FUEL VALVE CONT	4-213	4H 863	B11
GR4 TEMP SELECTOR AUTO SUP AND CONT		H1003	B12

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1)

(2) Remove screws (2)

(3) Remove temperature sensor (3)

D. Install

(1) Install temperature sensor (3)

(2) Install screws (2)

(3) Connect electrical connector (1)

E. Close Up

(1) Close access doors

(2) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2 B (2).

F. Test

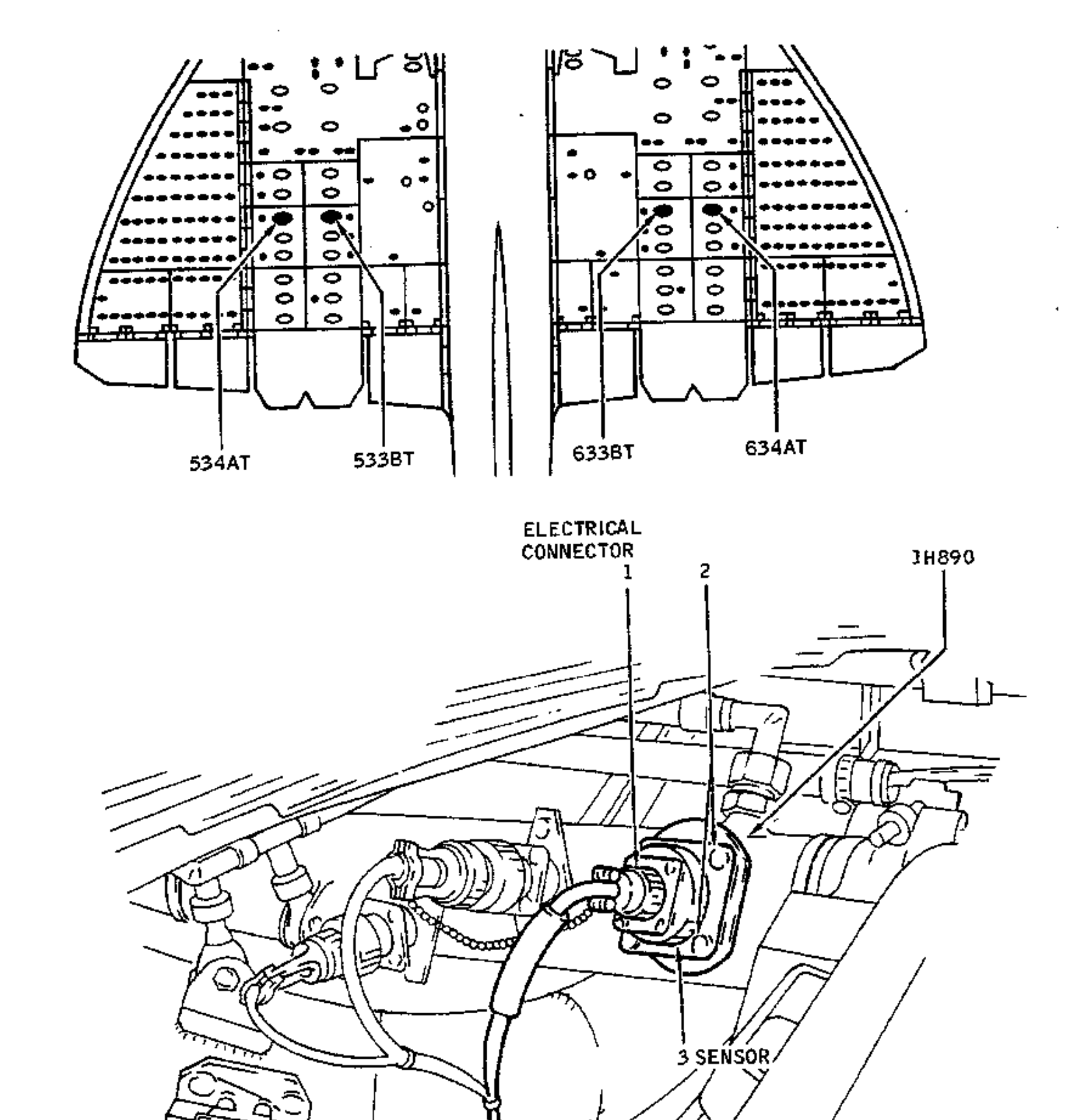
Carry out the following test procedure (Reference 21-10-00 ADJUSTMENT/TEST).

(1) Operation Test - Indicator Light Test.

(2) Operational Test of Warning Indicators

(a) Fuel Overheat Test

(b) Close-up.



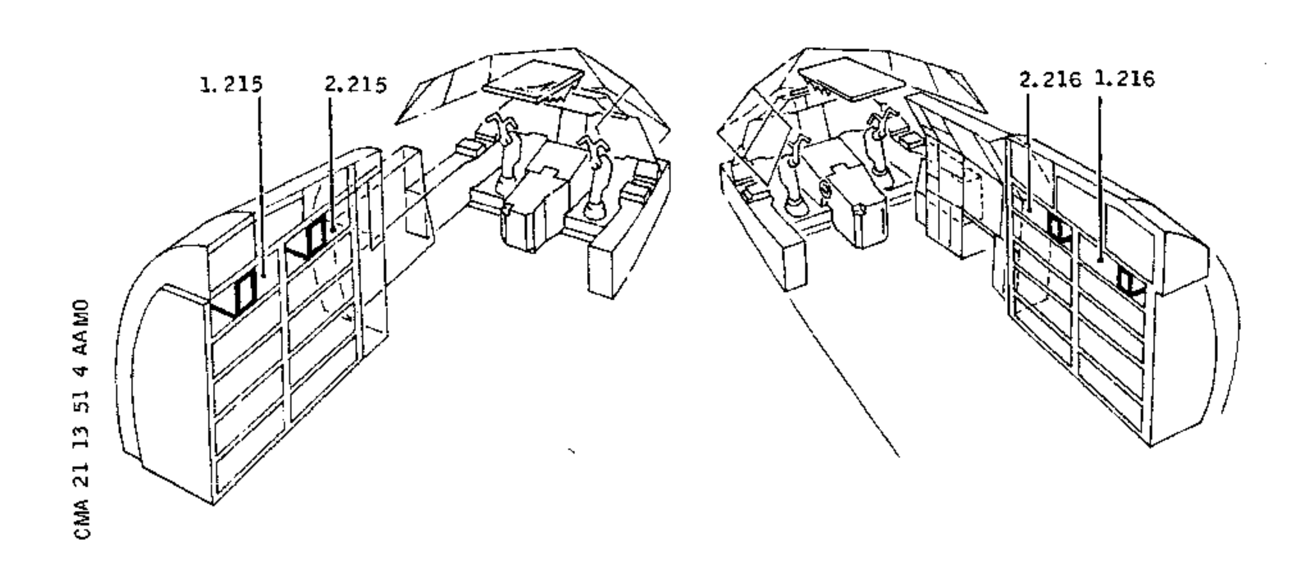
Fuel Heat Exchanger Air Outlet
Temperature Sensor
Figure 401

MASTER CONTROL UNIT - REMOVAL/INSTALLATION

1. General

   A. The removal/installation procedure is identical for all master control units, only their location is different

2. Master Control Unit (Ref. Fig. 401)



Location of Master Control Units
Figure 401

   A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	

   B. Prepare

      (1) On electronics racks open the relevant panels :

Panel 2-215 for group 1 master control unit
Panel 1-215 for group 2 master control unit
Panel 1-216 for group 3 master control unit
Panel 2-216 for group 4 master control unit

(2) Trip safety and tag the following circuit breakers

(a) for group 1 master control unit

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 FUEL VALVE CONT	2-213	1H 863	D16
GRP1 TEMP SELECTOR AUTO SUP & CONT		H1000	B17

(b) for group 2 master control unit

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP2 FUEL VALVE CONT	4-213	2H 863	E12
GRP2 SELECTOR AUTO SUP & CONT		H1001	E11

(c) for group 3 master control unit

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP3 FUEL VALVE CONT	2-213	3H 863	F16
GRP3 SELECTOR AUTO SUP & CONT		H1002	G16

(d) for group 4 master control unit

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP4 FUEL VALVE CONT	4-213	4H 863	B11
GRP4 SELECTOR AUTO SUP & CONT		H1003	B12

C. Remove

(1) Unscrew attaching nut until it is out of the tab.

(2) Move nut and screw assembly downwards.

(3) Pull master control unit. Hold unit to prevent it from falling when it is out of the electronics rack.

RB (4) Examine rack and unit connectors for:

RB (a) Bent, damaged or corroded contact pins.

RB (b) Distorted, displaced or blackened socket
RB contacts.

RB (c) Pierced, or otherwise damaged dielectric.

RB (d) Connector body free from damaged polarising
RB posts and keyways.

RB <u>NOTE</u>: If connector is damaged refer to WDM 20-42-71.

D. Preparation of Replacement Component

RB (1) Examine unit connector for:

RB (a) Bent, damaged or corroded contact pins.

RB (b) Distorted, displaced or blackened socket
RB contacts.

RB (c) Pierced, or otherwise damaged dielectric.

RB (d) Connector body free from damaged polarising
RB posts and keyways.

RB <u>NOTE</u>: If connector is damaged refer to WDM 20-42-71.

(2) Check that master control unit is free from dents or traces of corrosion.

E. Install

(1) Install master control unit in its location.

(2) Lift the screw and nut assembly and screw the latter in tab on front face of master control unit.

(3) Tighten nut fully.

F. Close-Up

(1) Remove safety clips and tags and reset the following circuit breakers.

(a) For group 1 master control unit

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 FUEL VALVE CONT	2-213	1H 863	D16
GRP1 TEMP SELECTOR AUTO SUP & CONT		H1000	B17

(b) For group 2 master control unit

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP2 FUEL VALVE CONT	4-213	2H 863	E12
GRP2 TEMP SELECTOR AUTO SUP & CONT		H1001	E11

(c) For group 3 master control unit

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP3 FUEL VALVE CONT	2-213	3H 863	F16
GRP3 TEMP SELECTOR AUTO SUP & CONT		H1002	G16

(d) For group 4 master control unit

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP4 FUEL VALVE CONT	4-213	4H 863	B11
GRP4 TEMP SELECTOR AUTO SUP & CONT		H1003	B12

(2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(3) On electronics racks close the relevant panels:

Panel 2-215 for group 1 master control unit
Panel 1-215 for group 2 master control unit
Panel 1-216 for group 3 master control unit
Panel 2-216 for group 4 master control unit

MASTER CONTROL UNIT - ADJUSTMENT/TEST

1. General

The purpose of this test is to check that the master control unit operates correctly after a removal/installation.

2. Master Control Unit

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	

B. Prepare

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing)

(2) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 PEMP SELECTOR AUTO SUP & CONT	2-213	H1000	B17
GRP2 TEMP SELECTOR AUTO SUP & CONT	4-213	H1001	E11
GRP3 TEMP SELECTOR AUTO SUP & CONT	2.213	H1002	G16
GRP4 TEMP SELECTOR AUTO SUP & CONT	4.213	H1003	B12

C. Test

In zone 2-215, on master control unit 1H868 :

(1) Check of Water Separator Function
- On master control unit test connector 1H868, check that voltage between terminal C and the aircraft ground is 115VAC.

- Ground terminal D. The voltage between terminal C and the aircraft ground drops to 0 volt.
- Check that the voltage between terminal B and the aircraft ground is 115VAC.
- Cut off ground to terminal D. The voltage between terminal B and the aircraft ground drops to 0 volt.

(2) Check of Fuel Control Valve 1H887 Control Function
RB - Short circuit terminals U and V, X and Y of test connector.
- Check that voltage is 115VAC between terminals Z and G. On panel 2-214, check that FUEL VALVE magnetic indicator displays a vertical stripe. If the magnetic indicator was already in this position, place FUEL VALVE switch (on panel 2-214) in OPEN position. Wait until the valve opens (magnetic indicator displays a horizontal stripe) and place FUEL VALVE switch in AUTO position, the fuel control valve returns to closed position (magnetic indicator displays a vertical stripe).
RB Open the circuit between terminals X and Y, short circuit terminals W and Y.
RB Check that voltage is 115VAC between terminals a and G.
The fuel control valve must open, FUEL VALVE magnetic indicator must display a horizontal stripe. If the magnetic indicator was already in this position, place FUEL VALVE switch in SHUT position and wait until the fuel control valve closes (magnetic indicator displays a vertical stripe).
Place FUEL VALVE switch in AUTO position. The valve must open (magnetic indicator displays a horizontal stripe).
RB Open the circuit between terminals U and V and W and Y.

(3) Check of Mass Flow Indicator Function.
- Trip circuit breaker H1000. On mass flow indicator 1DG1 (panel 2-214) the flow indicating pointer is in Z position.
- Reset circuit breaker H1000. The mass flow indicating pointer moves to maximum flow position then returns to 0 position.

D. Close-Up

De-energize the aircraft electrical network and disconnect electrical ground power unit.

CROSS BLEED SYSTEM - DESCRIPTION AND OPERATION

1. General (Ref. Fig. 001)

A. A cross bleed system is provided between each pair of air conditioning groups on the same side of the aircraft, i.e.: between groups 1 and 2 and between groups 3 and 4. Each group has a valve which allows the group to be isolated. Each engine may be started from the adjacent engine on the same side.

B. Air is bled downstream of the dual pressure reducing shut-off valve of each engine and taken through a stainless steel pipe to a cross bleed valve. The two cross bleed valves are interconnected by a pipe to which the high pressure ground connection and the pipes supplying the engine start valves are connected.

2. Operation

A. The electro-pneumatic cross bleed valve is controlled by a solenoid and opens as soon as the solenoid is energized.

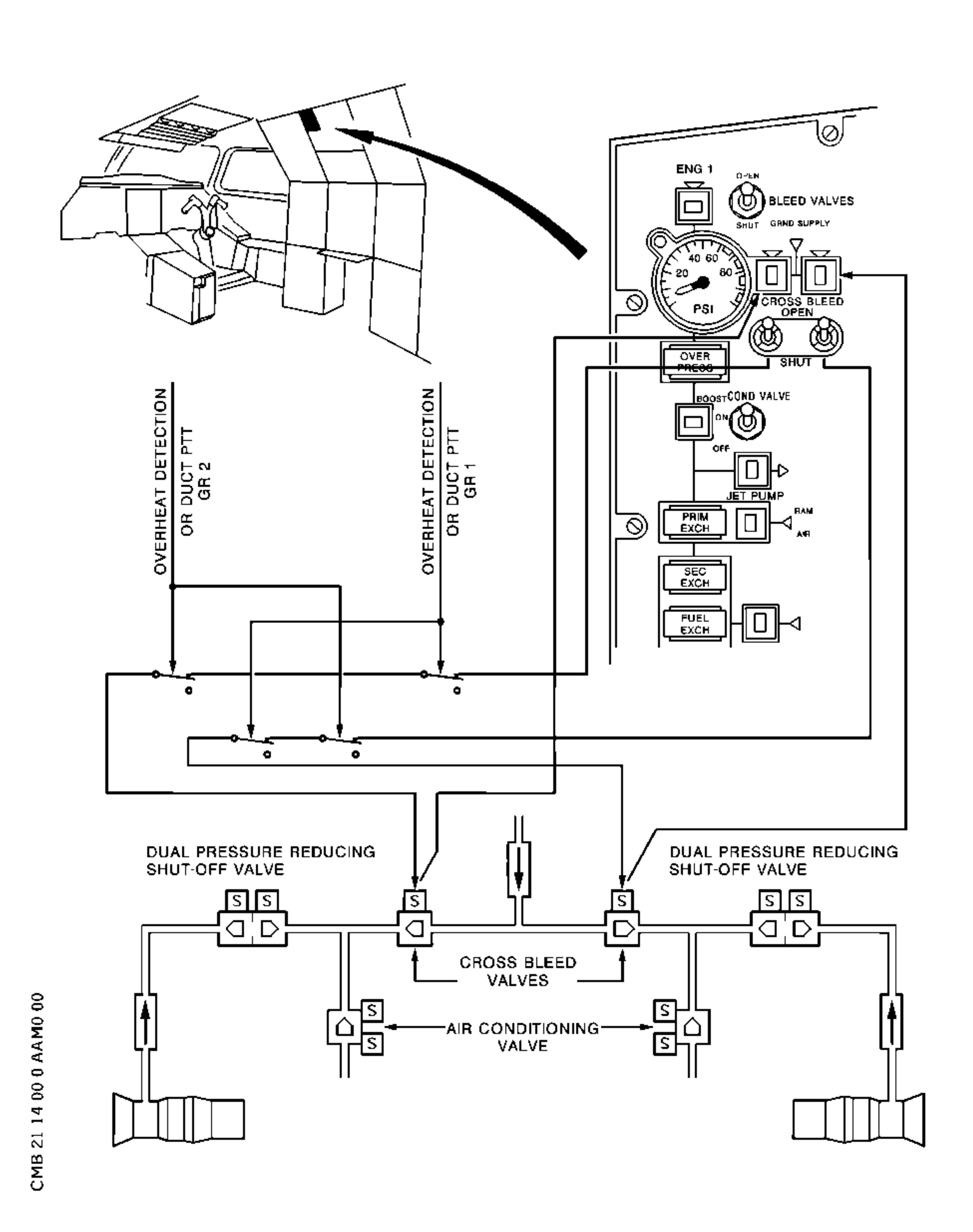
(1) Valve opening is controlled by a CROSS BLEED switch with SHUT and OPEN positions, it is located on the AIR BLEED CONTROL panel, a magnetic indicator displays the valve position.

(2) To supply engine 2 air conditioning group from engine 1, place both CROSS BLEED switches on AIR BLEED CONTROL panel in OPEN position. The cross bleed valve is automatically closed when fire control handle is operated, and when there is an overheat detection at the cabin inlet.

B. Operation of cross bleed valve in normal opening, normal closing, safety and test closing. (Ref. Fig. 002 and 003)

(1) Normal opening

Power supply from circuit breaker 1H861 energizes the cross bleed valve 1H879 control solenoid through CROSS BLEED switch 1H865 in OPEN position and relays 1H862 and 2H707 in de-energized position. When the valve is open, the valve opening microswitch is switched and grounds CROSS BLEED magnetic indicator 1H873, the latter displays a horizontal stripe which indicates that the valve is open.



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Cross Bleed System
Figure 001

(2) Normal closing

When the CROSS BLEED switch 1H865 is switched to SHUT, the power supply to cross bleed valve 1H879 control solenoid is cut out, the valve returns to the closed position and switches the closing microswitch which grounds CROSS BLEED magnetic indicator 1H873. The latter displays a vertical stripe which indicates that the valve is closed.

(3) Safety closing of cross bleed valve 1H879 and 2H879 if overheat thermoswitch 1H679 detects a temperature greater than or equal to 210°C.

If overheat thermoswitch 1H679 detects a temperature greater than or equal to 210°C, relay 1H707 is energized and cuts out power supply to cross bleed valve 2H879. 2 seconds later relay 1H618 is energized which causes:

- Closing of dual pressure reducing shut-off valve
- Energization of relay 1H682

When relay 1H682 is energized:

- Power supply to cross bleed valve 1H879 is cut out
- Group 1 cabin isolation valve closes
- Relay 1H619 is self held in de-energized position and relay 1H618 is self held in energized position
- Both cross bleed valves are closed and both closing microswitches ground magnetic indicators 1H873 and2H873, they display a vertical stripe
- Even if one of the two CROSS BLEED switches 1H865 or 2H865, or both at the same time are in OPEN position neither valve can open.

(4) Cross bleed valve closing by means of fire control handle

When fire control handle is pulled, switch 1W160 is switched on which energizes relays 1H686, 1H619 and 1H707.

- Relay 1H686 grounds the circuit
- Relay 1H619 cuts out the self-hold function
- Relay 1H707 cuts out power supply to cross bleed valve 2H879.

2 seconds later relay 1H618 is energized which causes:

- Dual pressure reducing shut-off valve to close
- Relay 1H682 to be energized.

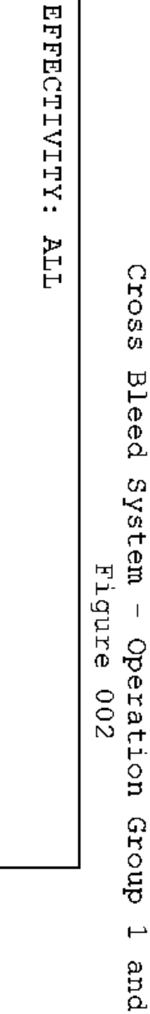
CMB 21 14 00 0 ACM0 00

CROSS BLEED GROUP 1

1H 611
BLEED VALVE SWITCH
28V
CB
A3 D
E A2
A1
2 S 3
0 1
A D 1
E 2
BLEED VALVE
1H 613
TEST DUCT
2 S
1H 618
1H 710
1H 682
>210°C
A
1H 679
CLOSE
C 1H 873
D C
O E
B
A
CROSS BLEED M.I.
1H 861
CB
28V
CROSS BLEED SWITCH
2 S 3
0 1
C2 E C1
D C3
B2 D B3
E B1
A
B
1H 879
CROSS BLEED VALVE SOLENOID
OPEN
28V
CB
1H 611
1H 707
1H 865

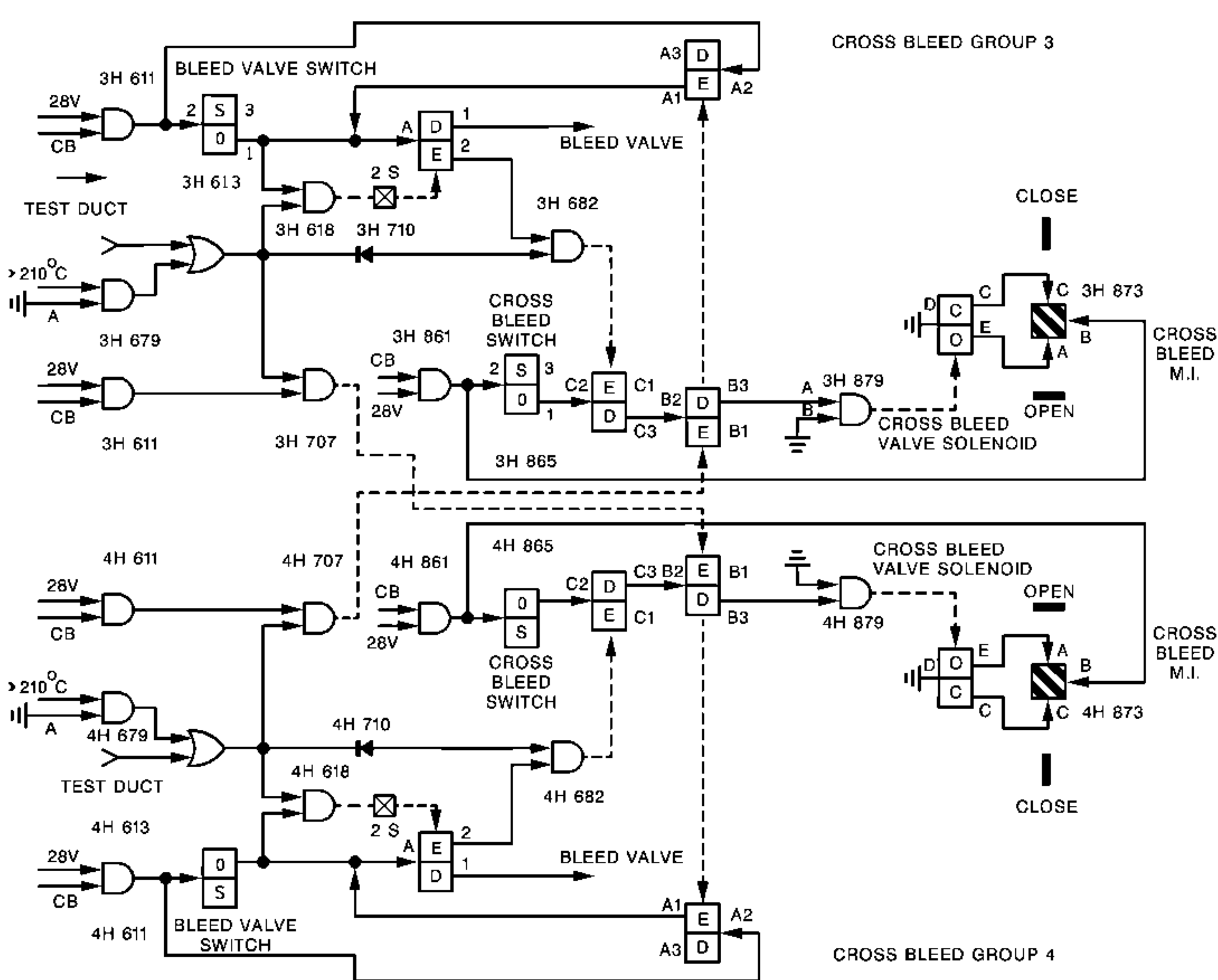
2H 611
2H 707
2H 861
2H 865
28V
CB
CB
28V
2 0
S 3
CROSS BLEED SWITCH
C2 D C3
E C1
B2 E B1
D B3
B
A
2H 879
CROSS BLEED VALVE SOLENOID
OPEN
D O E
C C
A
B
C 2H 873
CROSS BLEED M.I.
CLOSE
>210°C
A
2H 679
TEST DUCT
2H 710
2H 618
2H 682
2 S
2H 613
28V
CB
2 0 1
S 3
A O 2
C 1
BLEED VALVE
2H 611
BLEED VALVE SWITCH
A1 E A2
A3 D
CROSS BLEED GROUP 2

Cross Bleed System - Operation Group 1 and 2
Figure 002



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CMB 21 14 00 0 AEM0 00



Cross Bleed System - Operation Group 3 and 4
Figure 003

When relay 1H682 is energized, it causes:

- Cross bleed valve 1H879 to close
- Cabin isolation valve 1H678 to close.

NOTE: When engine 2 fire control handle is pulled, the valves are closed in the following order:

- System 1 cross bleed valve 1H879
- System 2 dual pressure reducing shut-off valve
- System 2 cross bleed valve
- System 2 cabin isolation valve

(5) Cross bleed valve 1H879 safety test.
Without pressure, CROSS BLEED switch 1H865 is in ON position. When DUCT warning light 1H629 is pressed, the valve closes as for an overheat detection but opening of relay 1H619 is delayed in order to avoid operation of the self-hold system.

Only DUCT warning light associated with cabin isolation valve 1H678 indicates closed. The other CROSS BLEED magnetic indicators 1H873 and 2H873 remain closed, the valves being already closed because of the absence of pressure.

With pressure, CROSS BLEED switches are in OPEN position, CROSS BLEED magnetic indicators 1H873 and 2H873 display a horizontal stripe (valve open). By pressing DUCT warning light 1H629 an overheat is simulated and self-hold system is not operated.

The operation is identical to the cabin inlet overheat detection one. Both cross bleed valves and the cabin isolation valve close. The CROSS BLEED magnetic indicators 1H873 and 2H873 display a vertical stripe (closed) as soon as DUCT warning light is released. CROSS BLEED magnetic indicators 1H873 and 2H873 display a horizontal stripe (open position).

The CROSS BLEED switches 1H865 and 2H865 are placed again in SHUT position, the two CROSS BLEED valves close, magnetic indicators 1H873 and 2H873 display a vertical stripe.

CROSS BLEED SYSTEM - TROUBLE SHOOTING

WARNING : OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN CHAPTER 24-00-00, SERVICING.

1. General

The following information is intended to enable faults found in flight or on the ground to be quickly rectified.

This information is given in the form of fault analysis synoptic charts.

The electrical wiring is assumed to be serviceable. However, if the component fault is not found, check the wiring in accordance with the Wiring Diagram Manual 21-1401.

The system consists of four identical groups ; the trouble shooting procedure is given for group 1. Designation, identifier and location of components corresponding to groups 2, 3 and 4
R are given in components identification table 101 at the end of
R the topic.

During trouble shooting operation, the aircraft is on the ground with shock absorbers compressed.

2. Prepare

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
1 Multimeter	

R B. Ground Air Supply Unit

(1) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1 ENG 1 C/BLEED VALVE CONT	1-213	1H 861	D12
Group 2			

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 2 C/BLEED VALVE CONT	5-213	2H 861	F 8
Group 3 ENG 3 C/BLEED VALVE CONT	15-215	3H 861	B 4
Group 4 ENG 4 C/BLEED VALVE CONT	15-216	4H 861	B24

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

R (3) Connect the ground air supply unit and pressurize the
R aircraft.

(4) Cross bleed system trouble shooting.

Fault	Condition / Action
The cross bleed valve (6) does not open	CROSS BLEED switch (4) in OPEN position. CROSS BLEED magnetic indicator (5) displays SHUT. Chart 101
	CROSS BLEED switch (4) in OPEN position. CROSS BLEED magnetic indicator (5) displays stripes. Replace circuit breaker (3)
The cross bleed valve does not close.	CROSS BLEED switch in SHUT position. CROSS BLEED magnetic indicator displays OPEN. Replace cross bleed valve
Cross bleed valve position indication is faulty.	CROSS BLEED switch (4) in OPEN or SHUT position. CROSS BLEED magnetic indicator (5) displays stripes. Ref. chart 102

R

```
R  ***************************************--------------------------------
R  * CROSS BLEED SWITCH (4) IN          *| GROUND EQUIPMENT REQUIRED     |
R  * OPEN POSITION                      *|-------------------------------|
R  * CROSS BLEED MAGNETIC INDICATOR (5) *| DESCRIPTION         PART NO.  |
R  * IN SHUT POSITION                   *|-------------------------------|
R  ***************************************| 1 MULTIMETER                  |
R  ----------------------------------------------------------------------
R  | On connector 1H879A, check on      |
R  | aircraft network side that voltage |
R  | is 28V between terminals A and B   |
R  --------------------------------------
R      ||        |                         -------------------------------
R      ||        |                        | Replace cross bleed valve    |
R      0V        28V----------------------| 1H879 (6)                    |
R      ||                                  -------------------------------
R  --------------------------------------
R  | On connector 1H879A, on aircraft   |
R  | network side, check voltage between|
R  | terminal A and aircraft ground.    |
R  --------------------------------------
R      ||        |                         -------------------------------
R      ||        |                        | Replace the wiring           |
R      0V        28V----------------------| Ref. WDM 21-14-01            |
R      ||                                  -------------------------------
R  --------------------------------------
R  | Check voltage between terminal 1   |
R  | of switch 1H865 and aircraft ground|
R  --------------------------------------
R      ||        |
R      ||        |                         -------------------------------
R      ||        |                        | Replace relays               |
R      0V        28V----------------------| 1H682 (1) and 2H707 (2)      |
R      ||                                  -------------------------------
R      ||                                  -------------------------------
R      ||---------------------------------| Replace CROSS BLEED          |
R                                         | switch 1H865 (4)             |
R                                          -------------------------------
```

R Chart 101 Sheet 1

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```
    ************************************-------------------------------
R   * CROSS BLEED SWITCH (4) IN OPEN OR *| GROUND EQUIPMENT REQUIRED   |
R   * SHUT POSITION.                    *|-----------------------------|
R   * CROSS BLEED MAGNETIC INDICATOR (5) *| DESCRIPTION       PART NO. |
R   * DISPLAYS STRIPES.                 *|-----------------------------|
R   ************************************| MULTIMETER                  |
R                                        -------------------------------

    ************************************
R   * On cross bleed valve (6) disconnect*
    * connector 1H879A.                 *
    * On plug, shunt in turn terminals D *
    * and E (Opening) and D and C       *
R   * (Closing). The indicator (5) dis-  *
    * plays OPEN-CLOSED in turn.        *
    ************************************
            ||              |
            YES             NO
            ||              |                ------------------------------
            ||              |                | Replace magnetic indicator |
R           ||              |----------------| 1H873 (5).                 |
            ||                               ------------------------------
            ||                               ------------------------------
            ||                               | Replace cross bleed valve  |
R           ||-------------------------------| 1H879 (6).                 |
                                             ------------------------------
```

R Chart 102 Sheet 1OF1

	ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
R R	[1] Relay	123AB	7-123	1H682		21-10-00 R/I	21-14-11
R R	Relay	123AB	7-123	2H682		21-10-00 R/I	21-14-11
R R	Relay	123AB	8-123	3H682		21-10-00 R/I	21-14-11
R R	Relay	123AB	8-123	4H682		21-10-00 R/I	21-14-11
R R	[2] Relay	123AB	7-123	1H707		21-10-00 R/I	21-14-11
R R	Relay	123AB	7-123	2H707		21-10-00 R/I	21-14-11
R R	Relay	123AB	8-123	3H707		21-10-00 R/I	21-14-11
R R	Relay	123AB	8-123	4H707		21-10-00 R/I	21-14-11
R R	[3] ENG1 circuit breaker C/BLEED VALVE CONT		1-123	1H861	D 12	24-50-00 R/I	21-14-11
R R	ENG2 C/BLEED VALVE CONT		5-123	2H861	F 8	24-50-00 R/I	21-14-11
R R	ENG3 C/BLEED VALVE CONT		15-215	3H861	B 4	24-50-00 R/I	21-14-11
R R	ENG4 C/BLEED VALVE CONT		15-216	4H861	B 24	24-50-00 R/I	21-14-11
R							
R R	[4] Switch CROSS BLEED		2-214	1H865		21-10-00 R/I	21-14-11
R R	Switch CROSS BLEED		2-214	2H865		21-10-00 R/I	21-14-11
R R	Switch CROSS BLEED		2-214	3H865		21-10-00 R/I	21-14-11
R R	Switch CROSS BLEED		2-214	4H865		21-10-00 R/I	21-14-11
R R	[5] Magnetic indicator CROSS BLEED		2-214	1H873		21-10-00 R/I	21-14-11
R R	Magnetic indi- cator CROSS BLEED		2-214	2H873		21-10-00 R/I	21-14-11
R R	Magnetic indi- dicator CROSS BLEED		2-214	3H873		21-10-00 R/I	21-14-11

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
Magnetic indicator CROSS BLEED		2-214	4H873		21-10-00 R/I	21-14-11
(6) Valve-cross bleed	415CL	415CL	1H879		21-14-11 R/I	21-14-11
Valve-cross bleed	426CR	426CR	2H879		21-14-11 R/I	21-14-11
Valve-cross bleed	435CL	435CL	3H879		21-14-11 R/I	21-14-11
Valve-cross bleed	446CR	446CR	4H879		21-14-11 R/I	21-14-11

Component Identificaiton
Table 101

3. Close-Up

A. Shut down and disconnect ground air supply unit.

B. De-energize the aircraft electrical network and disconnect electrical ground power unit (24-41-00).

CROSS BLEED VALVE - REMOVAL/INSTALLATION

1. General

The removal procedure of cross bleed valves is identical in each air conditioning group. These valves are located on RH side of engines 2 and 4 and on LH side of engines 1 and 3.

2. Cross Bleed Valve

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 1.8 m (5 ft. 11 in.)	

B. Prepare

R (1) Trip, safety and tag one of the following circuit
R breakers :

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
	Group 1			
	ENG1 C/BLEED VALVE CONT	1-213	1H 861	D12
	Group 2			
R	ENG2 C/BLEED VALVE CONT	5-213	2H 861	F 8
	Group 3			
R	ENG3 C/BLEED VALVE CONT	15-215	3H 861	B 4
	Group 4			
R	ENG4 C/BLEED VALVE CONT	15-216	4H 861	B24

(2) Open access doors
R 415CL for removal of cross bleed valve in group 1
R 426CR for removal of cross bleed valve in group 2
R 335CL for removal of cross bleed valve in group 3
R 446CR for removal of cross bleed valve in group 4

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (4).

(2) Remove clamps (1) and (5).

(3) Remove cross bleed valve (3), discard seals (2) and (6).

D. Install

(1) Install valve (3), equipped with new seals (2) and (6).

(2) Install locking clamps (5) and (1).

<u>CAUTION</u> : CLAMPS SHALL BE INSTALLED WITH GREAT CARE. TORQUE TO 0.6 m.daN (53.082 lbf in.). CLAMP ATTACHMENT MUST BE LOCATED ON SIDE OF DUCT MARKED WITH AN ARROW. TORQUE LOAD
RB FOR POST MOD 21C100 AVICA CLAMPS IS
RB 120 lbs/ins.

(3) Connect electrical connector (4).

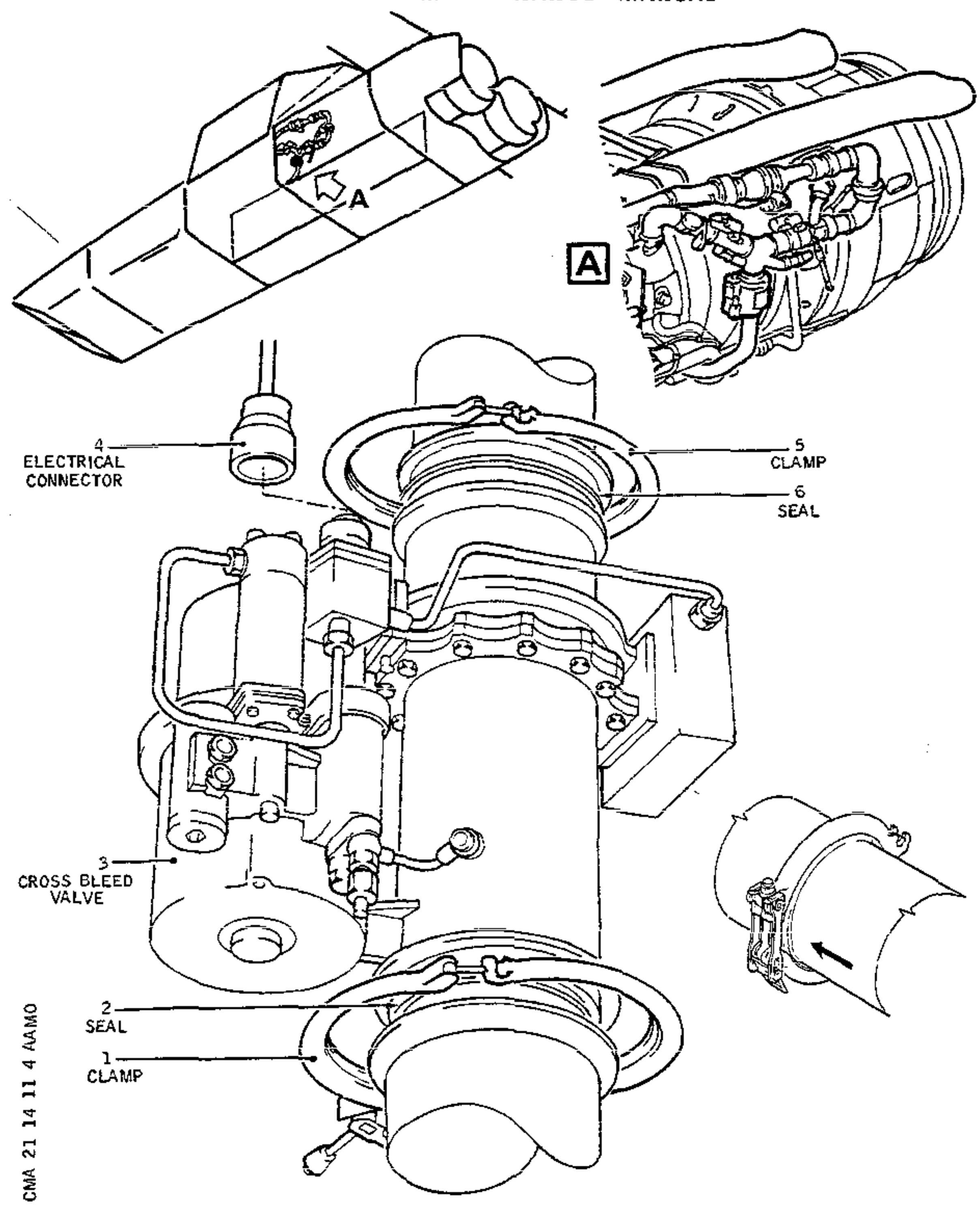
E. Test

Ref. 21-14-11, Adjustment/Test

F. Close-Up

(1) Close access doors.

(2) Remove safety clip and tag and reset the circuit breaker tripped in paragraph 2.B (1).



R Cross Bleed Valve
Figure 401

CROSS BLEED VALVE - ADJUSTMENT/TEST

1. General

The purpose of this test is to check the cross bleed valve for evidence of leakage and security of attachment after a removal/installation operation. The test covers the four cross bleed valves.

2. Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Ground Air Supply Unit : - Relative minimum pressure 2 bars, airflow 0.4 Kg/sec. - Relative maximum pressure 4.5 bars, airflow 0.6 Kg/sec. - Temperature must not exceed 300° C.	

B. Prepare

(1) Connect the electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, S).
Connect the ground air supply unit and pressurize the aircraft.

(2) On AIR BLEED CONTROL panel 2-214, check that circuit-breakers are placed in the following positions :

BLEED VALVE in SHUT position.
CROSS BLEED in SHUT position.
COND VALVE in OFF position.

(3) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 1 C/BLEED VALVE CONT	1-213	1H 861	D12
	5-213	2H 861	F 8

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
	15-215	3H 861	B 4
	15-216	4H 861	B24

C. Test

On AIR BLEED CONTROL panel 2-214, place CROSS BLEED switch in OPEN position. CROSS BLEED magnetic indicator displays a horizontal stripe.
Indicated pressure increases at pressure gage.

Check for evidence of leakage at level of cross bleed valve attachment clamps in engine nacelle :

- door 415CL for GR1
- door 426CR for GR2
- door 435CL for GR3
- door 446CR for GR4.

On AIR BLEED CONTROL panel 2-214, place CROSS BLEED switch in OFF position.
CROSS BLEED magnetic indicator displays a vertical stripe.
Pressure value drops to zero on pressure gage.

D. Close-Up

Shut down ground air supply unit and disconnect it from the aircraft.
De-energize the aircraft electrical network and disconnect electrical ground power unit.

END OF THIS SECTION

NEXT

FUEL LEAKAGE - WATER RECOVERY - DESCRIPTION AND OPERATION

1. General (Ref. Fig. 001)

2. Water Recovery

A. General

An intercooler drain valve is installed upstream of the turbine to prevent corrosion of the blades by water particles in suspension in the air.
Conditioned air must be rid of the moisture it contains before it is admitted to the cabin. A water separator is mounted in front of the distribution chamber for this purpose.

B. Intercooler Water Drain Swirler (Ref. Fig. 002)

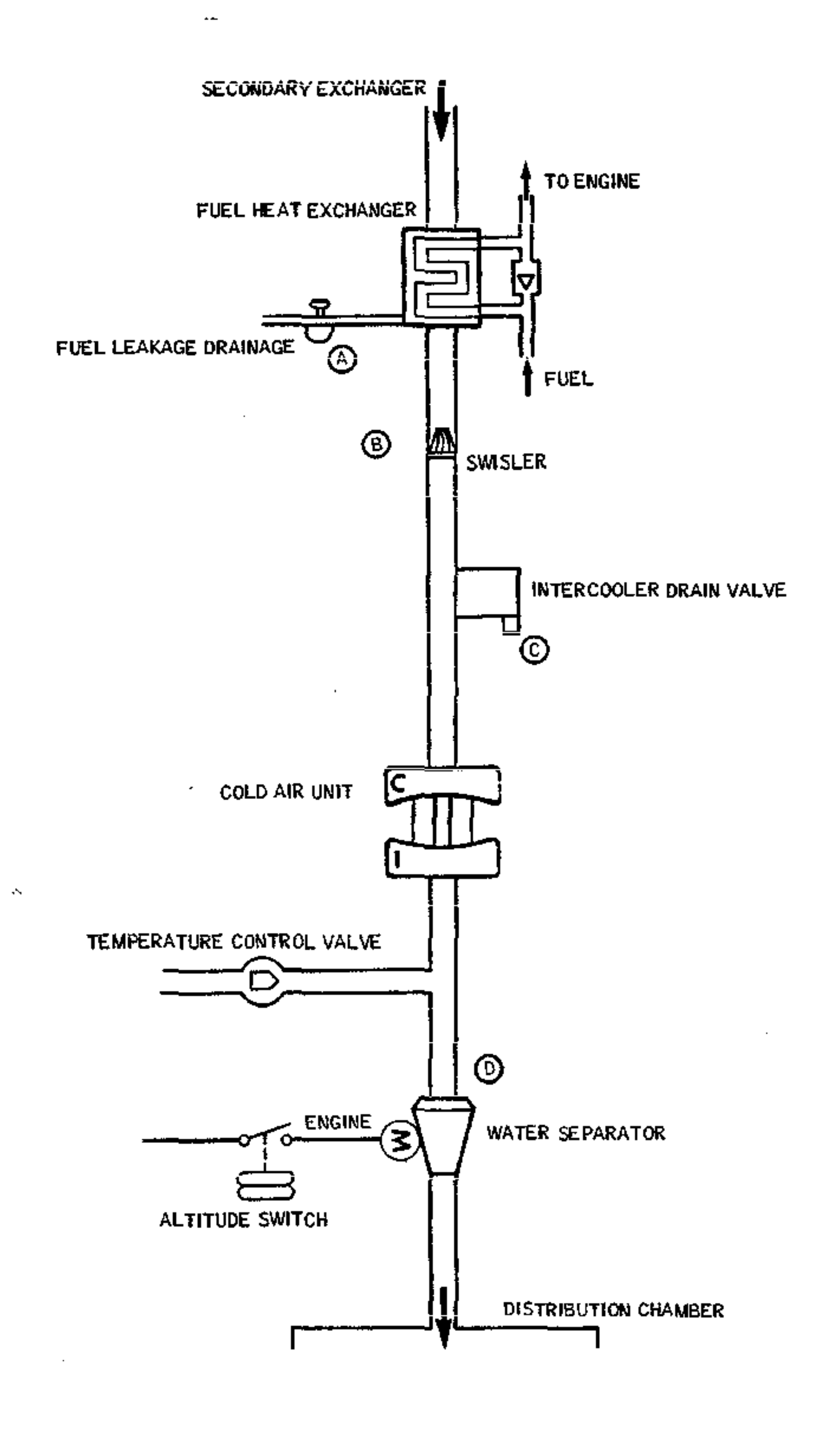
The swirler is comprised of a swirl vane assembly held between two end plates, and it is located inside an air duct.
Conditioned air enters the vanes, and water in suspension in the air is projected outwards by centrifugal force and flows along the walls of the ducting to an end collecting and discharge area.
The collected water is discharged through the intercooler drain valve.

C. Intercooler Drain Valve (Ref. Fig. 003)

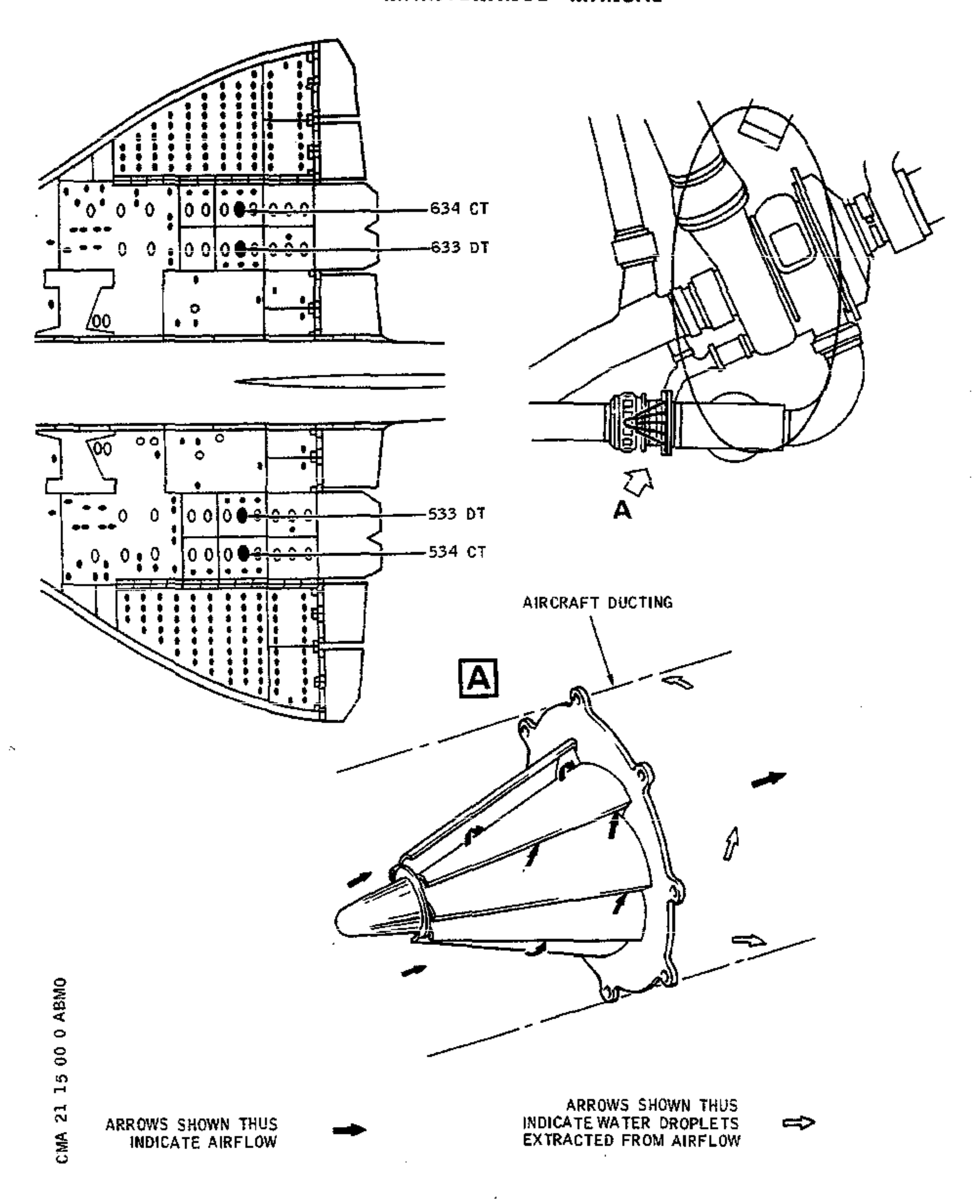
(1) Description/Operation

The intercooler drain valve is installed on the air duct between the fuel heat exchanger outlet and the cold air unit turbine. It operates in conjunction with an intercooler water drain swirler installed upstream of the air-conditioning duct. Water in suspension in the conditioned air is thrown against the internal walls of the ducting and is collected in the intercooler drain valve tank. When it reaches a certain level it is automatically discharged overboard.

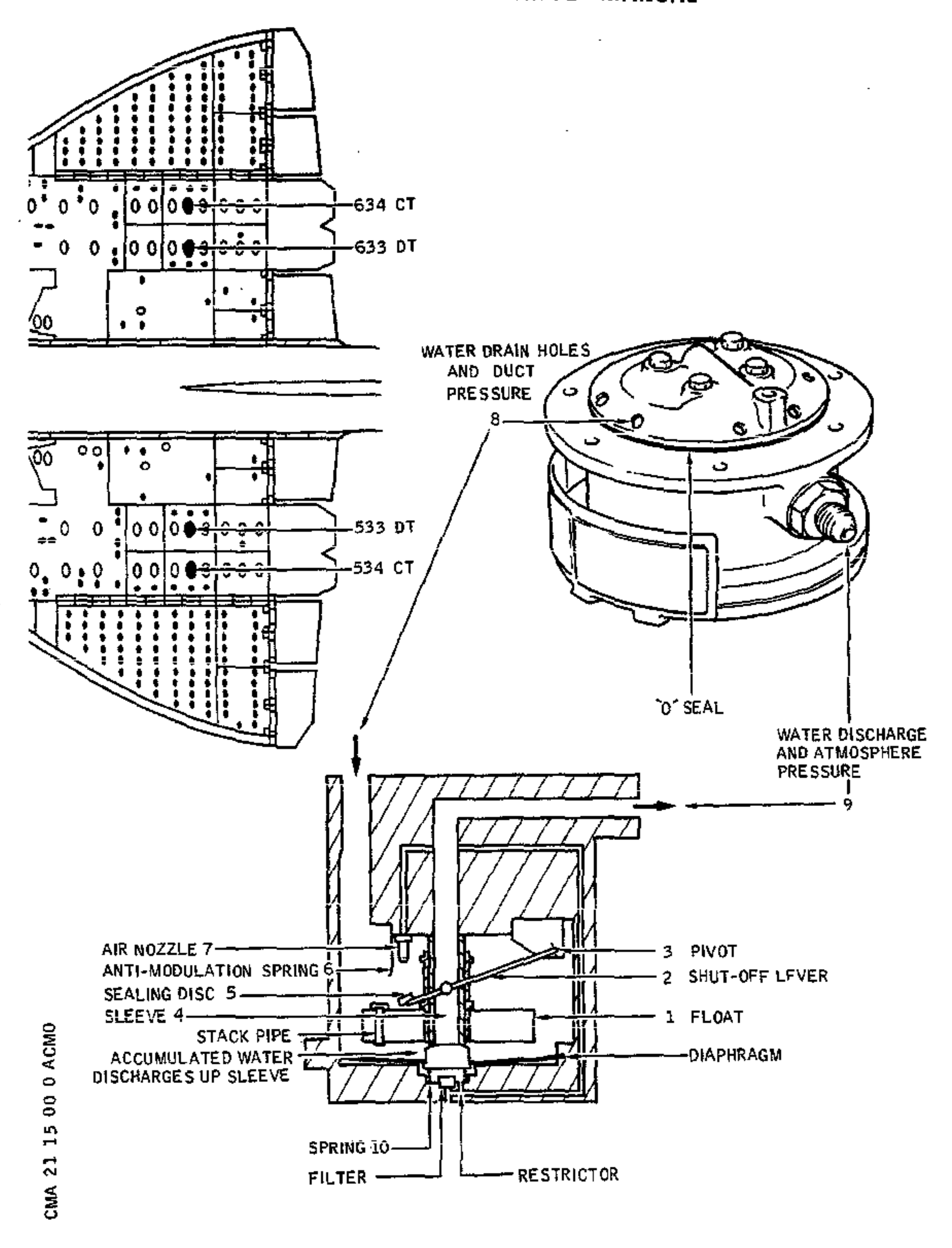
When the drain valve tank is empty the float (1) and shut-off lever (2) rest on the bottom of the sleeve (4). Air pressure is applied to the top surface of the diaphragm and also below it, through the air nozzle (7) and internal ducting.
The air pressure below the diaphragm is maintained at a level very close to that of the air in the



Water Recovery and Fuel Leakage
Figure 001



Intercooler Water Drain Swirler
Figure 002



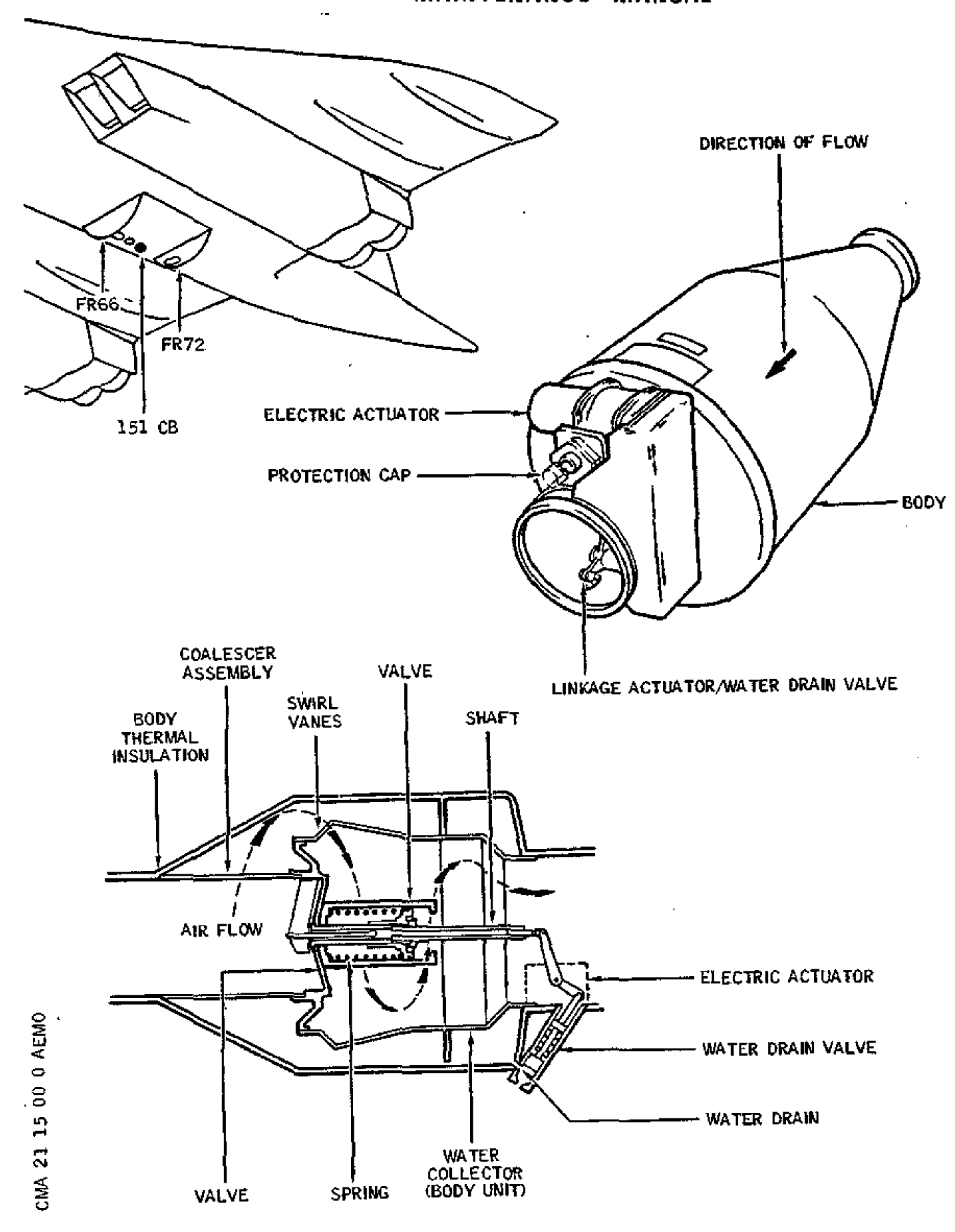
Intercooler Drain Valve Operation
Figure 003

inlet duct by means of an outlet to ambient air considerably smaller than the air inlet, located under the diaphragm.
Assisted by a spring, the air pressure beneath it keeps the diaphragm up against the end of the sleeve (4).
The pressure of the air in the tank above the diaphragm opposes these combined forces.
As the water collects in the tank the float (1) and shut-off cover (2) rise on the sleeve (4) until the sealing disc on the shut-off lever (2) seals off the air nozzle (7). At this moment pressurized air under the diaphragm passes to ambient air through a small restrictor hole located under the diaphragm. The pressure of the conditioned air combined with the weight of water above the diaphragm exceeds the force of the spring (10) under the diaphragm. The latter then retracts and becomes detached from the end of the sleeve (4).
The collected water, under air pressure is driven up the sleeve (4) and discharged overboard. When the water has been discharged the float (1) and shut-off lever (2) descend the length of the sleeve, thus disengaging the air nozzle (7) and enabling the conditioned air pressure to act upon the diaphragm which again seals off the sleeve (4).
To avoid vibration of the sealing disc on air nozzle (7) during discharge of the water, an anti-vibration spring holds the disc against the air nozzle (7) as long as water remains in the tank.
The sealing disc is detached from the air nozzle orifice when shut-off lever (2) is released by the weight of the descending float.

D. Water separator (Ref. Fig. 004)

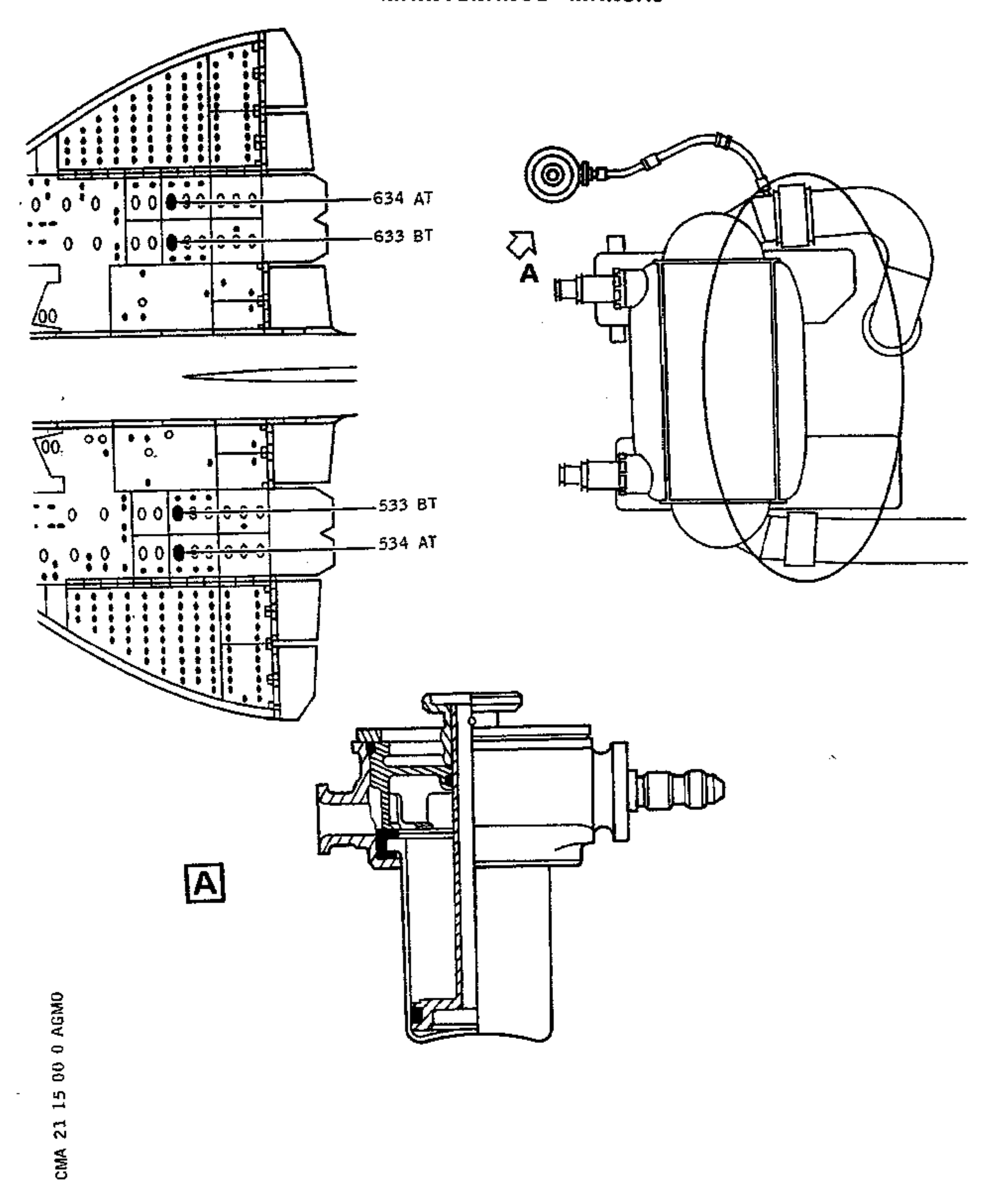
The water separator is installed in the fuselage between frames 67 and 68, under the pressurized compartment floor. Conditioned air inside it passes through a synthetic cloth coalescer assembly, and swirl vanes. Water in suspension in the air is thrown onto the separator unit inner wall and collected : a spring valve enables the water separator to be by-passed in the event of the coalescer assembly becoming clogged.
B The same valve in Groups 2, 3 and 4 controlled by an
B electric actuator can be employed to by-pass the water separator at altitudes where there is no humidity in the air. Valve opening is controlled by an altitude switch, at 30.000 ft (9000m) the water separator is by-passed.

3. Fuel Leakage (Ref. Fig. 005)



Water Separator
Figure 004

A drain is installed in the interspace of the fuel heat exchanger. Fuel leakages are drained into a recovery container. This enables any possible leakage of fuel to be checked on the ground.



Fuel Leakage Recovery
Figure 005

INTERCOOLER WATER DRAIN SWIRLER - REMOVAL/INSTALLATION

1. General

The Removal/Installation procedure of intercooler water drain swirler is identical for each group.

2. Intercooler Water Drain Swirler

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform	
Circuit Breaker Safety Clips	
Corrosion Resistant Steel Lockwire (Dia. 0.32 in.)	

B. Prepare

(1) Position access platform under the wing

(2) Open access doors

534 AT and 534 CT for Group 1
535 BT and 535 DT for Group 2
633 BT and 633 DT for Group 3
634 AT and 634 CT for Group 4

(3) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1			
GRP1 FUEL VALVE CONT	2-213	1H 863	D16
GRP1 TEMP SELECTOR AUTO SUP & CONT		H1000	B17
Group 2			
GRP2 FUEL VALVE CONT	4-213	2H 863	E12
GRP2 TEMP SELECTOR AUTO SUP & CONT		H1001	E11
Group 3			

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP3 FUEL VALVE CONT	2-213	3H 863	F16
GRP3 TEMP SELECTOR AUTO SUP & CONT		H1002	G16
Group 4			
GRP4 FUEL VALVE CONT	4-213	4H 863	B11
GRP4 TEMP SELECTOR AUTO SUP & CONT		H1003	B12

C. Remove (Ref. Fig. 401)

(1) Disconnect the three electrical connectors (1) (2) and (3).

(2) Disconnect rods (4) and (6).

(3) Remove connectors (8) and (10).

(4) Remove clamps (7) and (11).

(5) Remove lockwire and swivel union (5) ; remove duct (9).

(6) Remove screws (13) and remove intercooler water drain swirler (14) and duct (12).

D. Install

(1) Install intercooler water drain swirler (14) fitted with new seals (15).

(2) Install screws (13) securing duct (12) and intercooler water drain swirler (14).

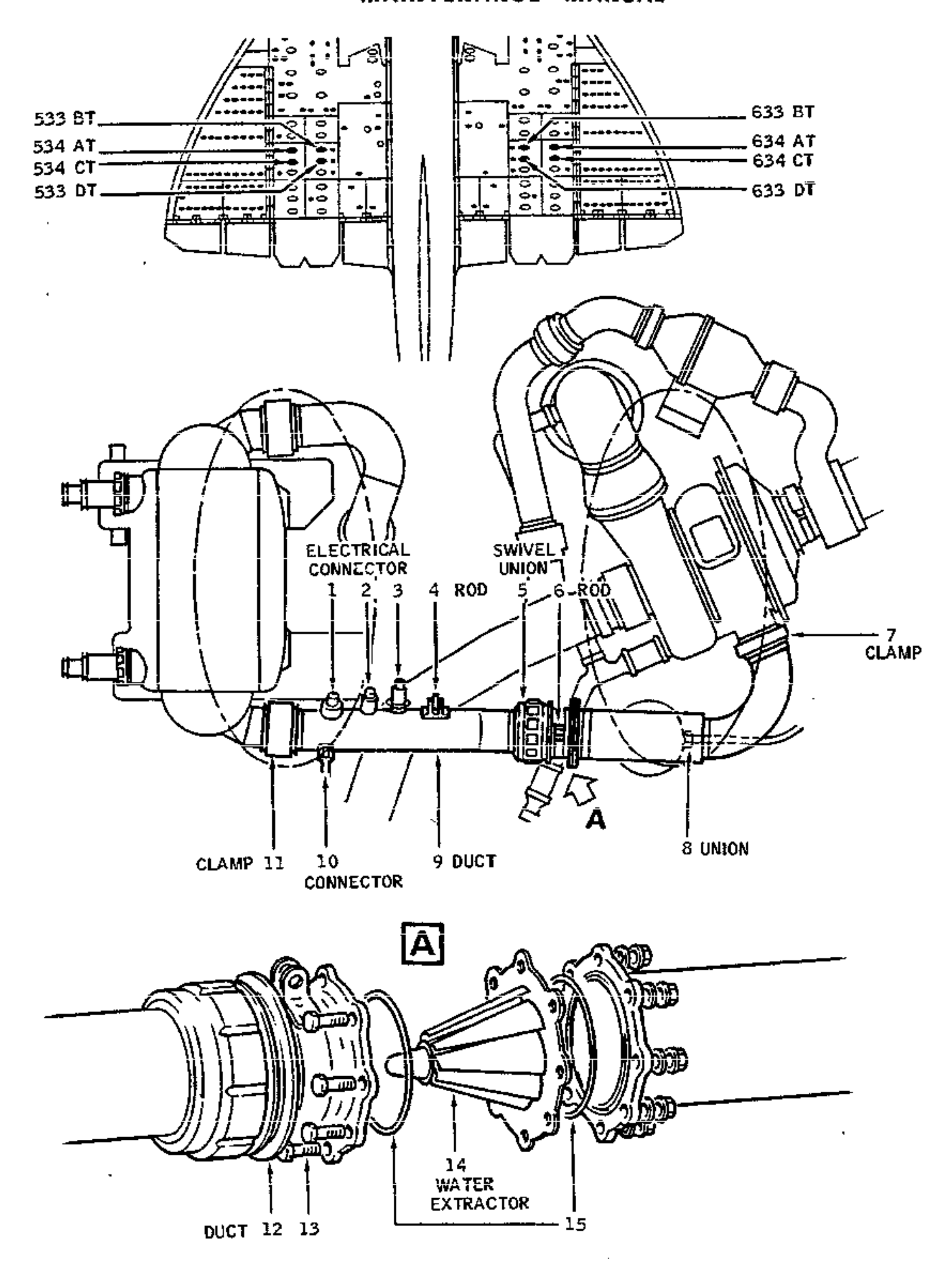
(3) Install duct (9) and start screwing swivel union (5).

(4) Install clamps (7) and (11) ; screw swivel union fully in order that duct (9) contacts clamps (11). Wirelock swivel union.

(5) Install rods (6) and (4).

(6) Connect connectors (10) and (8).

(7) Connect electrical connectors (1) (2) and (3).



Intercooler Water Drain Swirler
Figure 401

E. Close-Up

(1) Close access doors.

(2) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2.B.(3).

INTERCOOLER WATER DRAIN SWIRLER - ADJUSTMENT/TEST

1. General

The purpose of this test is to check the intercooler water drain swirler for leakage after a removal/installation procedure.

2. Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Ground Air Supply Unit - Relative Minimum Pressure : 2 bars Minimum Airflow : 0.4 kg/s - Relative Maximum Pressure : 4.5 bars Maximum Airflow : 0.6 kg/s The temperature must not exceed 300°C	
Circuit Breaker Safety Clips	

B. Prepare

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(2) Connect ground air supply unit.

(3) On AIR BLEED CONTROL panel 2-214, check that the following switches are in the position indicated below :

- BLEED VALVE switch in SHUT position
- CROSS BLEED switch in SHUT position
- COND VALVE switch in OFF position

(4) Place FUEL VALVE switch in OPEN position then in SHUT position. Check that the fuel control valve position changes on FUEL VALVE magnetic indicator (time delay). Place switch back to the AUTO position.

(5) It is required that an observer be under the nacelle and connected to the flight compartment by telephone.

(6) Trip, safety and tag the air start valves circuit breakers :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 1 & 4 AIR START CONT	15-215	K 181	C15
ENG 2 & 3 AIR START CONT	15-216	K 182	C11

WARNING : BEFORE STARTING THE TEST, MAKE CERTAIN THAT IN ENGINE ZONE, THE AIR START VALVES ARE CLOSED ; THE POSITION INDICATOR OF THE MANUAL CONTROL MUST BE PLACED IN SHUT POSITION.

(7) On FUEL MANAGEMENT panel 5-214, pressurize the fuel supply system of corresponding Cold Air Unit.
Check on level indicator that the minimum quantity of fuel is 2500 kg in the appropriate feed tank. Two out of the three ENGINE FEED PUMP switches associated with each feed tank are in ON position.
The corresponding LOW PRESS caption light goes off within 3 seconds.

(8) In case fuel system cannot be used, trip, safety and tag the following landing gear relays circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1 LH UC WEIGHT SW "A" SYS SUP	1-213	G 292	M17
Group 2 LH UC WEIGHT SW "B" SYS SUP	3-213	G 293	B 8
Group 3 RH UC WEIGHT SW "B" SYS SUP		G 294	B 9
Group 4 RH UC WEIGHT SW "A" SYS SUP	1-213	G 295	M18

WARNING : DURING TEST, FUEL EXCH WARNING LIGHT MAY COME ON. ON AIR BLEED CONTROL PANEL 2-214, PLACE FUEL VALVE SWITCH IN OPEN POSITION (SELF-HOLDING CANCELLATION).

C. Test

(1) Start up ground air supply unit.

(2) On AIR BLEED CONTROL panel 2-214, place CROSS BLEED switch in OPEN position and COND VALVE switch in ON position.
On TEMPERATURE CONTROL panel 2-214, a flow indication is displayed on MASS FLOW indicator.

(3) Check for leakage at level of intercooler water drain swirler attachment clamp.

(4) On AIR BLEED CONTROL panel 2-214, place COND VALVE switch in OFF position and CROSS BLEED switch in SHUT position.

(5) Shut down ground air supply unit.

D. Close-Up

(1) Disconnect ground air supply unit.

(2) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2. B (6).

(3) Restore Fuel System to initial state.

(4) Remove safety clips and tags and reset landing gear circuit breakers if they have been tripped.

(5) De-energize the aircraft electrical network and disconnect electrical ground power unit.

WATER SEPARATOR - REMOVAL/INSTALLATION

1. General

Removal/Installation of the water separator is identical for each group. The water separators are located on each side of the aircraft centreline between frames 67 and 68.

2. Water Separator

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 2.7 m (8 ft 9 in)	-
Aeroshell 7 grease (20-30-00, No.53)	-

B. Prepare

(1) Position access platform.

(2) Open access door 151CB.

B C. Remove (Ref. Fig. 401)

B (1) Disconnect electrical connector (4)-Groups 2, 3 and 4
B units only.

(2) Disconnect bonding strip (1).

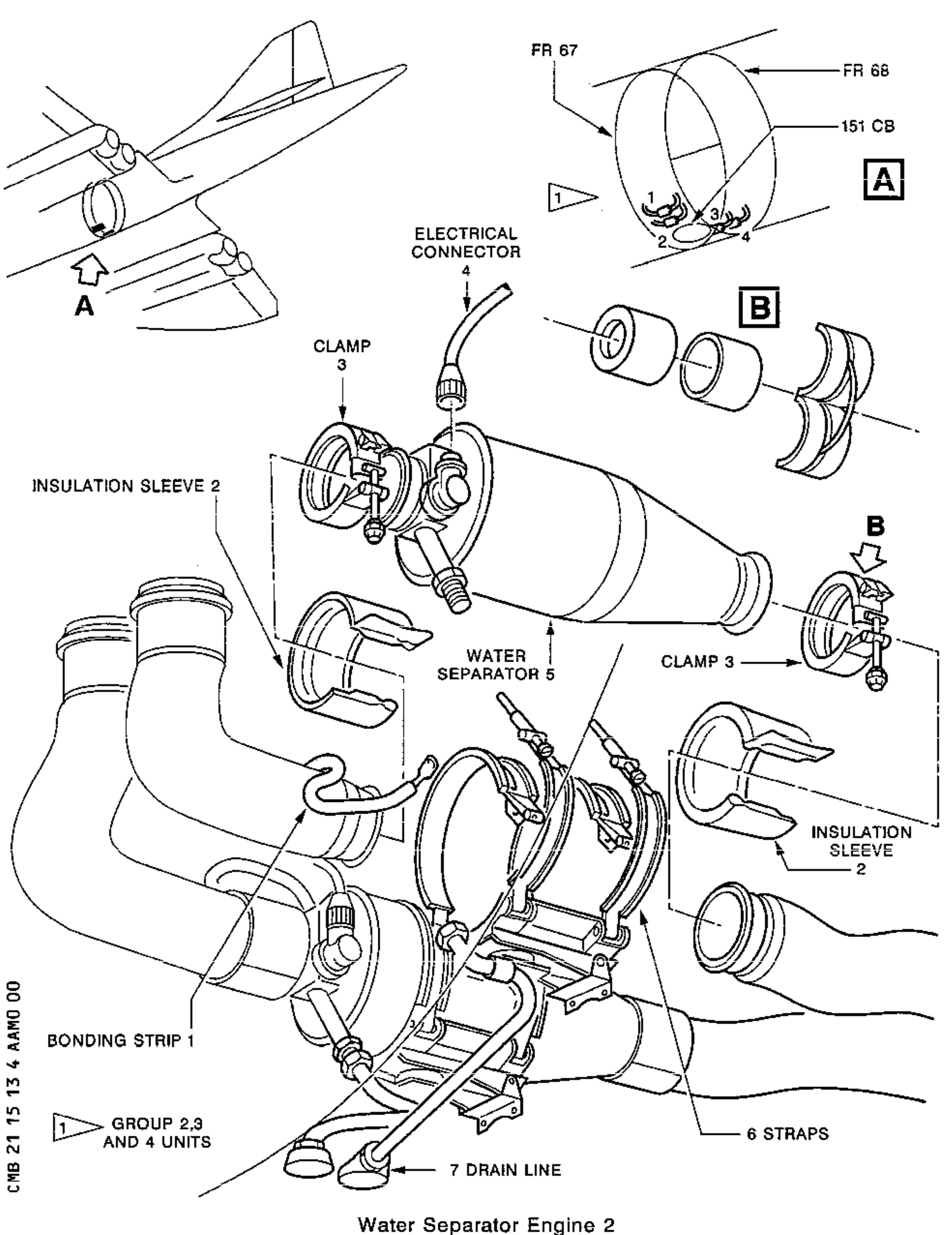
(3) Disconnect water drain line (7).

(4) Remove insulation sleeves (2).

(5) Remove adjustable clamps (3). Check condition of seals, discard them if necessary.

(6) Remove lockpin and open straps (6).

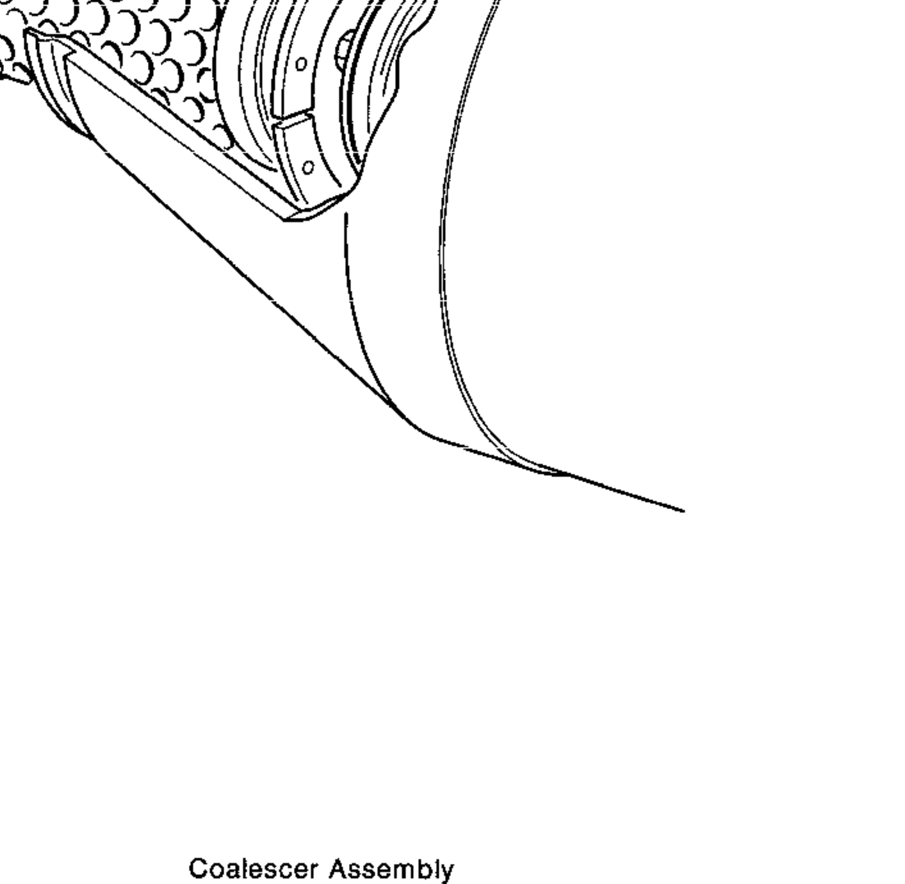
(7) Remove water separator (5).



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B
R

Water Separator Engine 2
Figure 401



R

Coalescer Assembly
Figure 402

D. Replacement of the Coalescer Assembly (Ref. Fig. 402)

CAUTION: DISMANTLE THE WATER SEPARATOR ONLY AS FAR AS IT IS NECESSARY TO REPLACE THE COALESCER ASSEMBLY.

ENSURE THAT TOOLS AND WORKBENCH ARE CLEAN.

HANDLE ALL PARTS WITH CARE AND PUT THE PARTS INTO CLEAN AND DUST PROOF CONTAINERS UNTIL THEY ARE REQUIRED FOR ASSEMBLY.

(1) Remove the circlip (1) and withdraw the end cap (2), spring (3), seal (4) and the coalescer assembly.

NOTE: Return the unserviceable coalescer assembly to workshops for sock replacement.

(2) Lubricate a new seal (4), Part No. 3349, with Aeroshell 7 grease and fit to serviceable coalescer assembly, Part No. 228943.

(3) Apply a film of Aeroshell 7 grease to both mating ends of the coalescer assembly and insert it into the body unit until it locates over the rim of the valve seat.

(4) Insert the spring (3) and end cap (2) into the inlet and secure them with the circlip (1).

E. Install (Ref. Fig. 401)

(1) Install water separator (5) on its mounting, close straps (6). Do not tighten.

(2) Connect drain line (7).

(3) Install new seals if necessary, install adjustable clamps (3).

(4) Connect bonding strip (1).

(5) Tighten straps (6) install lockpin.

(6) Install insulation sleeves (2).

(7) Connect electrical connector (4)-Groups 2, 3 and 4 units only.

F. Test (Ref. 21-15-13, Adjustment/Test).

G. Close-Up

(1) Close access door 151CB.

(2) Remove access platform.

WATER SEPARATOR - ADJUSTMENT/TEST

1. General

The purpose of this test is to check water separator for evidence of leakage after a removal/installation operation.

2. Operational Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Ground Air Supply Unit : - Relative Minimum Pressure 2 bars, Airflow 0.4 kg/sec. - Relative Maximum Pressure 4.5 bars, Airflow 0.6 kg/sec. - Temperature must not exceed 300°C	

B. Prepare

(1) Connect electrical ground power unit and energize the
R aircraft electrical network (Ref. 24-41-00, Servicing).

(2) Connect Ground air supply unit.

(3) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GROUP 1			
GRP 1 TEMP SELECTOR AUTO SUP & CONT	2-213	H1000	B17
GRP 1 FUEL VALVE CONT		1H 863	D16
GROUP 2			
GRP 2 TEMP SELECTOR AUTO SUP & CONT	4-213	H1001	E11
GRP 2 FUEL VALVE CONT		2H 863	E12
GROUP 3			
GRP 3 TEMP SELECTOR AUTO SUP & CONT	2-213	H1002	G16

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP 3 FUEL VALVE CONT		3H 863	F16
GROUP 4			
GRP 4 TEMP SELECTOR AUTO SUP & CONT	4-213	H1003	B12
GRP 4 FUEL VALVE CONT		4H 863	B11

R (4) Pressurize Fuel system

R WARNING : OBSERVE FUEL SYSTEM SAFETY PRECAUTIONS DES-
R CRIBED IN 28-00-00 AND 28-10-00.

R NOTE : Pressurization assumes a minimum quantity of
R fuel of 2500 Kg in the appropriate feed tank
R (1, 2, 3, 4).

R On centre console, place throttle control levers in
R SHUT position (lower mechanical stop).
R Check that crossfeed valves are closed and that asso-
R ciated magnetic indicators display vertical stripes.
R With the LP VALVE switch locked at OPEN by the switch
R guard, check that the associated magnetic indicator
R shows an in-line indication.
R Place first of the three ENGINE FEED PUMPS control
R switches in ON position (MAIN PUMP).

R Engine 1 Main Fuel Pump for group 1
R Engine 2 Main Fuel Pump for group 2
R Engine 3 Main Fuel Pump for group 3
R Engine 4 Main Fuel Pump for group 4

R Check that corresponding LOW PRESS indicator light
R goes off when pump operating pressure is reached.

R WARNING : FUEL SYSTEM MUST NOT OPERATE MORE THAN 2
R HOURS.

R In case Fuel System cannot be used .
R Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
For GRP1 LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
For GRP2 LH UC WEIGHT SW B SYS SUP	3-213	G 293	B 8
For GRP3 RH UC WEIGHT SW B SYS SUP	3-213	G 294	B 9
For GRP4 RH UC WEIGHT SW A SYS SUP	1-213	G 295	M18

WARNING : DURING TEST, FUEL EXCH WARNING LIGHT MAY ILLUMINATE. ON PANEL 2-214, PLACE FUEL VALVE SWITCH IN OPEN POSITION (SELF-HOLDING CANCELLATION).

C. Test

(1) Start ground air supply unit.

(2) On AIR BLEED CONTROL panel 2-214, place CROSS BLEED switch of group to be tested in OPEN position and COND VALVE switch in ON position.
Check that COND VALVE magnetic indicator displays a vertical stripe which indicates that air conditioning valve is open. Check flow rate on MASS FLOW indicator.

(3) On water separator, check for evidence of leakage at level of attachment clamps.

(4) Shut down ground air supply unit.

R (5) In case the Fuel system has been pressurized

Place ENGINE FEED PUMP switch in OFF position. After a few seconds the corresponding LOW PRESS indicator light must illuminate.

If necessary, remove safety clip and tag and reset circuit breaker tripped in paragraph 2 B (4).

If FUEL EXCH warning has come on during test after switching off the ground air supply unit, wait for cancellation of warning and place FUEL VALVE switch in AUTO position.

R (6) The letter S (Shut) must be visible in window showing the position of water separator valve.

R (7) For Group 1
R - Disconnect electrical connector H1056A and stow
R water separator electrical plug (aircraft wiring
R side).
R - Cap receptacle on water separator.

R (8) For groups 2-3-4
On master control unit 1 (2, 3, 4H868) located in zone 2-215, remove protective cap from test connector.
Ground test connector terminal D.
Water separator valve must operate.

R (9) The letter O (Open) must be visible in window showing the position of water separator valve.

R (10) Remove ground shunt from test connector. Install protective cap. The S letter must be visible in window.

R (11) On AIR BLEED CONTROL panel 2-214, place COND VALVE switch in OFF position and CROSS BLEED switch in SHUT position.

D. Close-Up

(1) Disconnect ground air supply unit.

(2) De-energize the aircraft electrical network and disconnect electrical ground power unit.

FUEL HEAT EXCHANGER DRAIN CANISTER - REMOVAL/INSTALLATION

1. General

Removal/installation procedure is identical for the fuel heat exchanger drain canisters of each air conditioning group.

2. Fuel/Heat Exchanger Drain Canister

A. Equipment and Materials

DESCRIPTION	PART NO.
Locking Plate	

B. Prepare

(1) Open access doors :

532CT for group 1 drain canister
531BT for group 2 drain canister
631BT for group 3 drain canister
632CT for group 4 drain canister

C. Remove (Ref. Fig. 401)

(1) Remove union (4).

(2) Loosen and remove nut (3).

(3) Remove drain canister (1), discard lock plate (5) and seal (2).

D. Install

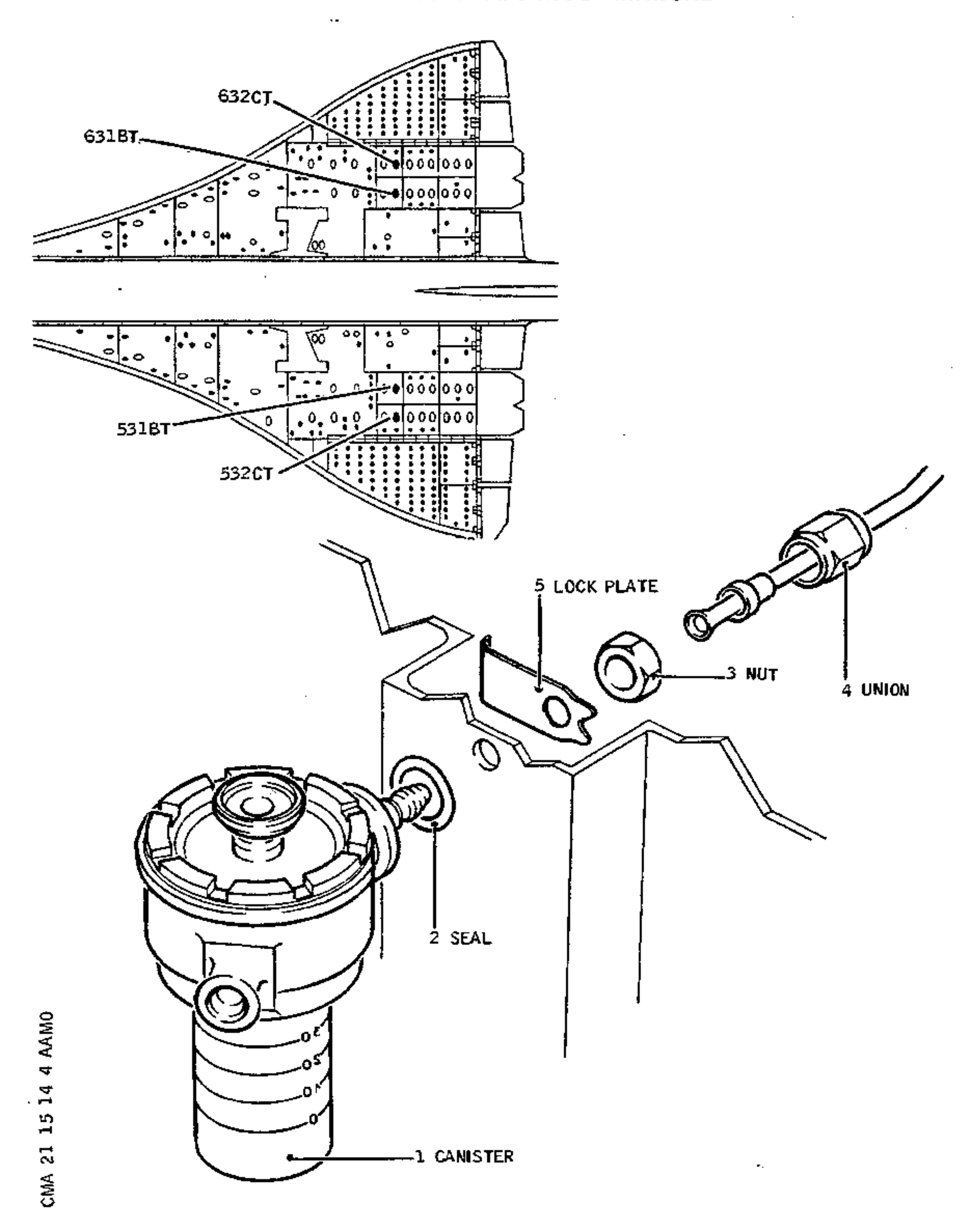
(1) Install drain canister (1) fitted with new seal (2).

(2) Install new lock plate (5), tighten nut (3). Torque to between 0.80 and 0.85 m.daN (70.776 and 75.199 lbf.in.).

(3) Connect union (4).

E. Close-Up

(1) Close access doors.



Fuel Heat Exchanger, Drain Canister
Figure 401

FUEL/HEAT EXCHANGER DRAIN CANISTER - INSPECTION/CHECK

1. General

A small amount of condensation water from the fuel heat exchanger interspace can enter the drain canister.
If fuel is found in the drain canister, the fuel/heat exchanger is unserviceable.

2. Drainage of Fuel/Heat Exchanger Drain Canister

A. Equipment and Materials

DESCRIPTION	PART NO.
Container	

B. Prepare

(1) Open access doors :

532CT for group 1 drain canister
531BT for group 2 drain canister
631BT for group 3 drain canister
632CT for group 4 drain canister

C. Drainage

(1) Operate the plunger to expel liquid contained in the drain canister.

D. Close-Up

Close access doors.

INTERCOOLER DRAIN VALVE - REMOVAL/INSTALLATION

1. General

The Removal/Installation procedure is identical for the intercooler drain valve of each group.

2. Intercooler Drain Valve

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platforms	
Protective Mats	
Circuit Breaker Safety Clips	
Corrosion Resistant Lockwire - Dia. 0.8 mm (.032 in.)	

B. Prepare

(1) Position access platform under wing.

(2) Position protective mats.

(3) Open access doors :

534AT and 534CT for group 1
535BT and 535DT for group 2
633BT and 633DT for group 3
634AT and 634CT for group 4

(4) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GROUP 1			
GRP 1 FUEL VALVE CONT	2-213	1H 863	D16
GRP 1 TEMP SELECTOR AUTO SUP & CONT		H1000	B17
GROUP 2			
GRP 2 FUEL VALVE CONT	4-213	2H 863	E12

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP 1 TEMP SELECTOR AUTO SUP & CONT		H1001	E11
GROUP 3			
GRP 3 FUEL VALVE CONT	2-213	8H 863	F16
GRP 3 TEMP SELECTOR AUTO SUP & CONT		H1002	G16
GROUP 4			
GRP 4 FUEL VALVE CONT	4-213	4H 863	B11
GRP 4 TEMP SELECTOR AUTO SUP & CONT		H1003	B12

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connectors (2) (3) and (4).

(2) Disconnect unions (9) and (11).

(3) Disconnect securing rods (5) and (8).

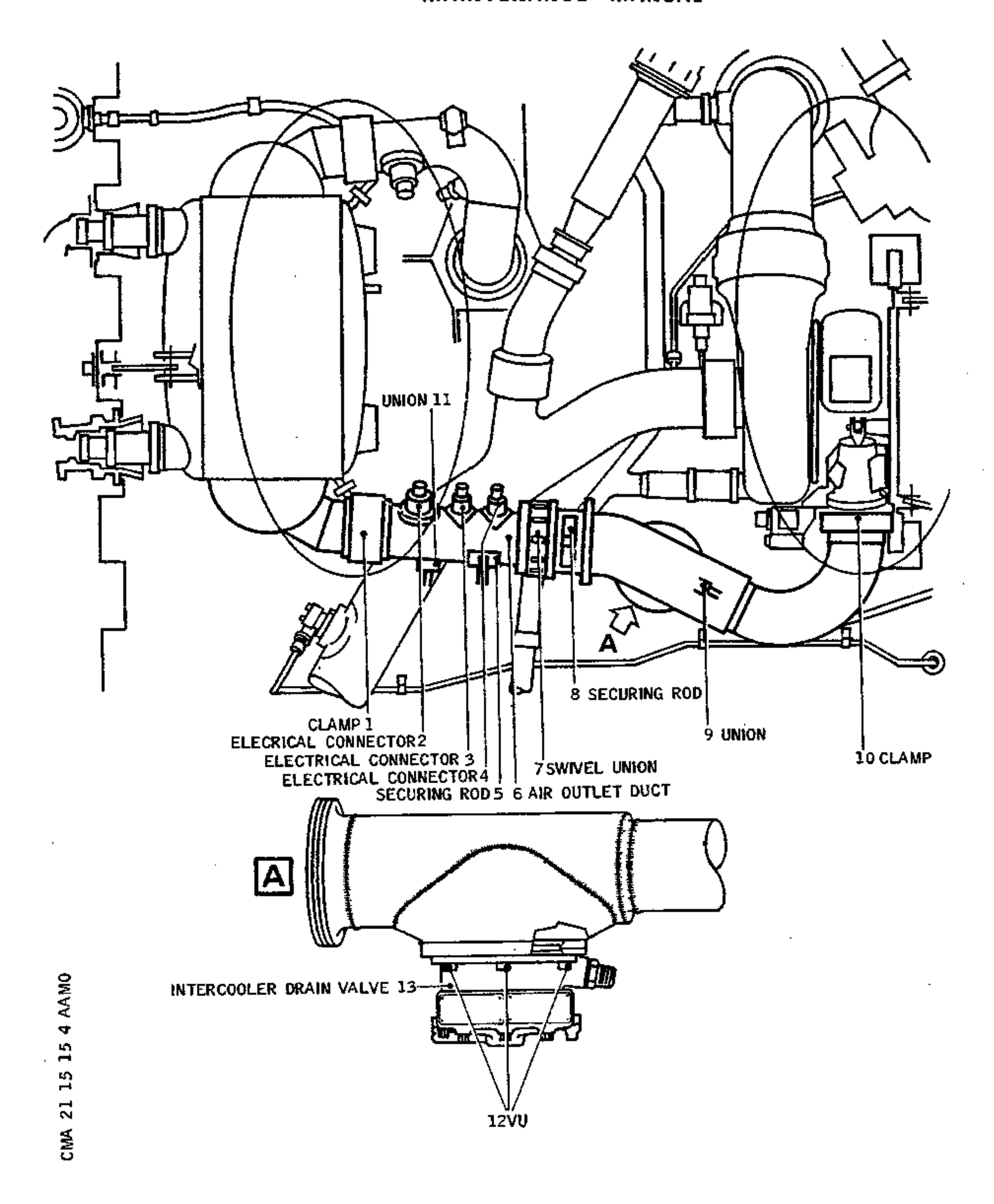
(4) Remove clamps (9) and (10).

(5) Cut and remove lockwire, remove swivel union (7).

(6) Remove duct section (6).

(7) Remove drain valve (13) securing screws (12).

(8) Remove drain valve.



Intercooler Drain Valve
Figure 401

D. Install

(1) Install drain valve (13) fitted with new seal.

(2) Install and tighten screws (12).

(3) Install duct section (6) tighten swivel union (7).

(4) Install clamps (1) and (10). Do not fully tighten.

(5) Screw swivel union (7) to position duct section (6) against stop in clamp (1). Safety swivel union with lockwire.

(6) Connect securing rods (5) and (8).

(7) Connect unions (9) and (11).

(8) Fully tighten (1) and (10).

(9) Connect electrical connectors (2) (3) and (4).

E. Close-Up

(1) Close access doors.

(2) Remove safety clips and tags and reset the circuit breakers tripped in para. 2. B. (4).

(3) Remove protective mats.

(4) Remove access platform.

INTERCOOLER DRAIN VALVE - ADJUSTMENT/TEST

1. General

The purpose of this test is to check the intercooler drain for leakage after a removal/installation procedure.

2. Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Ground Air Supply Unit - Relative Minimum Pressure : 2 bars Minimum Airflow : 0.4 kg/s - Relative Maximum Pressure : 4.5 bars Maximum Airflow : 0.6 kg/s The temperature must not exceed 300°C	
Circuit Breaker Safety Clips	

B. Prepare

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(2) Connect ground air supply unit.

(3) On AIR BLEED CONTROL panel 2-214, check that the following switches are in the position indicated below :

- BLEED VALVE switch in SHUT position
- CROSS BLEED switch in SHUT position
- COND VALVE switch in OFF position

(4) Place FUEL VALVE switch in OPEN position then in SHUT position. Check that the fuel control valve position changes on FUEL VALVE magnetic indicator (time delay). Place switch back to the AUTO position.

(5) It is required that an observer be under the nacelle and connected to the flight compartment by telephone.

(6) Trip, safety and tag the air start valves circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 1 & 4 AIR START CONT	15-215	K 181	C15
ENG 2 & 3 AIR START CONT	15-216	K 182	C11

WARNING : BEFORE STARTING THE TEST, MAKE CERTAIN THAT IN ENGINE ZONE, THE AIR START VALVES ARE CLOSED ; THE POSITION INDICATOR OF THE MANUAL CONTROL MUST BE PLACED IN SHUT POSITION.

(7) On FUEL MANAGEMENT panel 5-214, pressurize the fuel supply system of corresponding Cold Air Unit.
Check on level indicator that the minimum quantity of fuel is 2500 kg in the appropriate feed tank. Two out of the three ENGINE FEED PUMP switches associated with each feed tank are in ON position.
The corresponding LOW PRESS caption light goes off within 3 seconds.

(8) In case fuel system cannot be used, trip, safety and tag the following landing gear relays circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1			
LH UC WEIGHT SW "A" SYS SUP	1-213	G 292	M17
Group 2			
LH UC WEIGHT SW "B" SYS SUP	3=213	G 293	B 8
Group 3			
RH UC WEIGHT SW "B" SYS SUP		G 294	B 9
Group 4			
RH UC WEIGHT SW "A" SYS SUP	1-213	G 295	M18

WARNING : DURING TEST, FUEL EXCH WARNING LIGHT MAY COME ON. ON AIR BLEED CONTROL PANEL 2-214, PLACE FUEL VALVE SWITCH IN OPEN POSITION (SELF-HOLDING CANCELLATION).

C. Test

(1) Start up ground air supply unit.

(2) On AIR BLEED CONTROL panel 2-214 place CROSS BLEED switch in OPEN position and COND VALVE switch in ON position.
On TEMPERATURE CONTROL panel 2-214, a flow indication is displayed on MASS FLOW indicator.

(3) Check for leakage at level of intercooler drain valve attachment zone.

(4) On AIR BLEED CONTROL panel 2-214, place COND VALVE switch in OFF position and CROSS BLEED switch in SHUT position.

(5) Shut down ground air supply unit.

D. Close-Up

(1) Disconnect ground air supply unit.

(2) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2. B (6).

(3) Restore fuel system to initial state.

(4) Remove safety clips and tags and reset landing gear circuit breakers if they have been tripped.

(5) De-energize the aircraft electrical network and disconnect electrical ground power unit.

AUXILIARY ACCESSORIES - DESCRIPTION AND OPERATION

1. General

Auxiliary accessories of air conditioning groups consist of :

A. 4 dust centrifugers

B. 2 3 in. dia. ground connections with N.R.V.

C. 1 Preconditioned air supply valve assy.

2. Dust Centrifugers (Ref. Fig. 001)

For each air conditioning group,

A. Dust centrifugers are located on heat exchanger downstream duct.

They consist mainly of :

(1) A brazed body (1), with both ends equipped with a flange for attachment clamp.

(2) A vortex generator (4) inside the body.

(3) A purge tube (3) tangential with the body.

(4) A dewhirl generator (2).

The dust centrifugers have no moving parts.

B. Operation

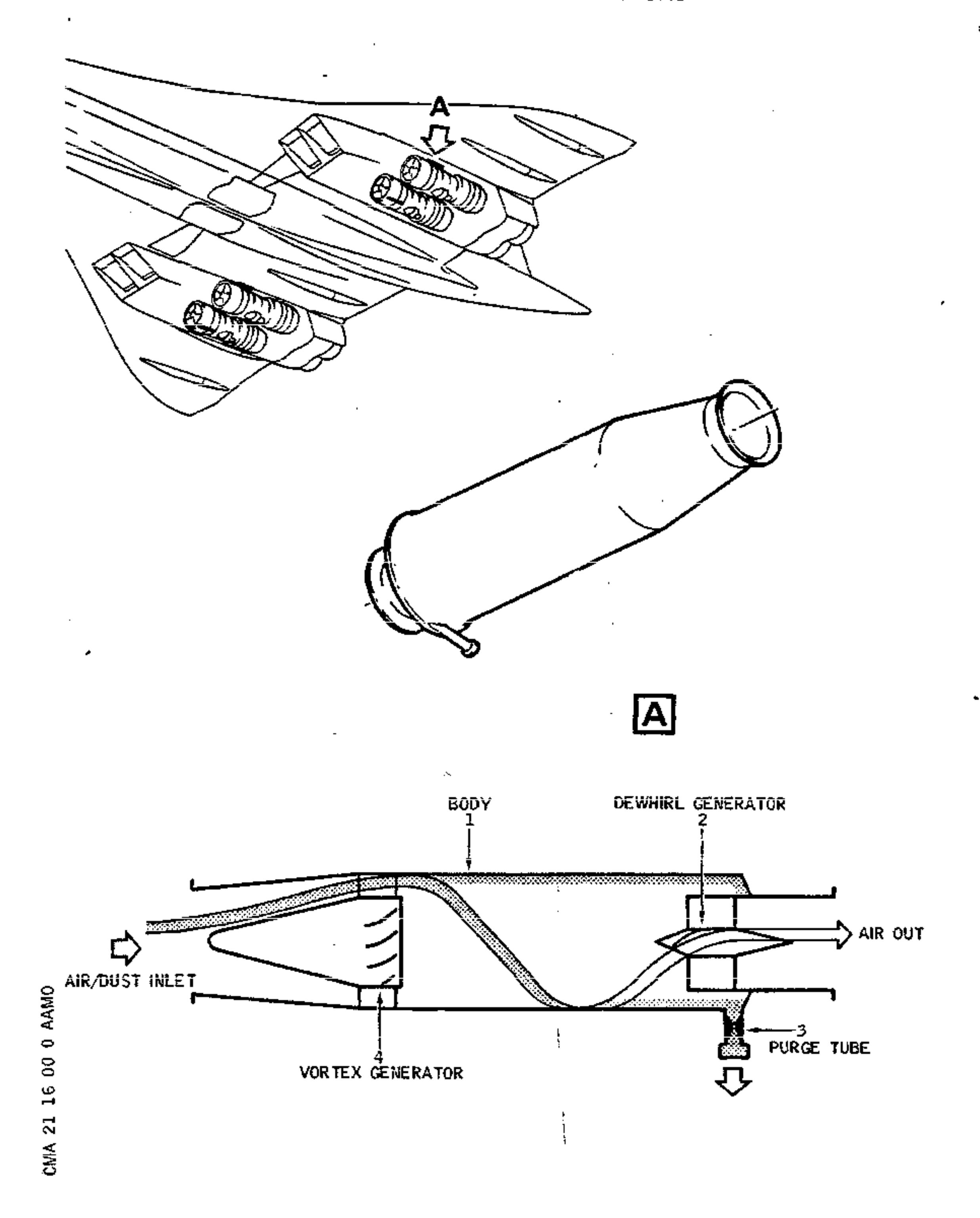
(1) Dust laden air flows through the vortex generator. Under the action of centrifugal force, the dust deposits on the periphery of the body. Filtered air flows out through the dewhirl generator.

(2) The outlet orifice can be blanked off during a pressure test of the system.

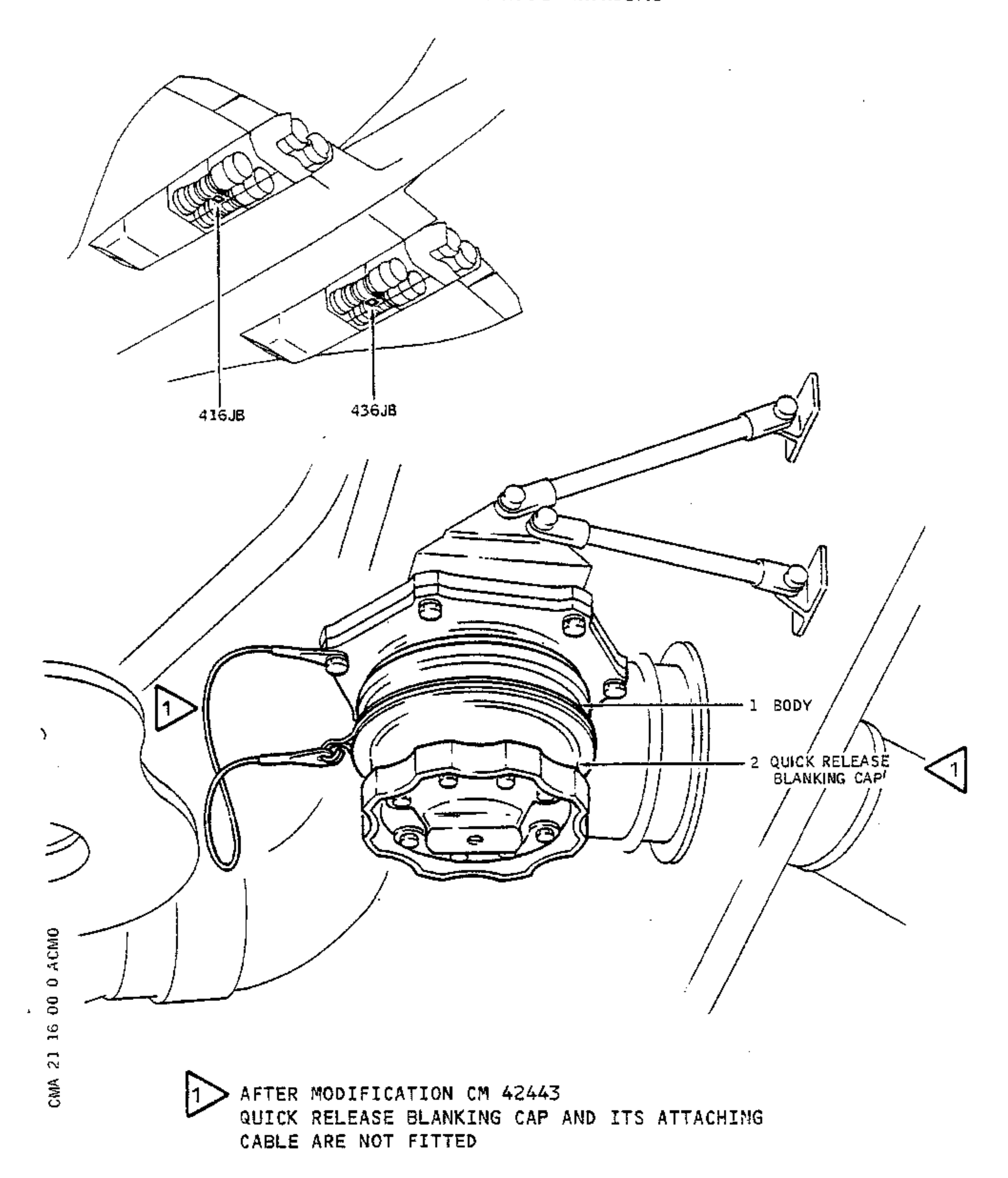
3. Connections - Ground (Ref. Fig. 002)

A. Description

The aircraft is equipped with two ground connections which serve for the connection of a high pressure air supply used either to start the engines or to test the operation of the air conditioning systems.



Dust Centrifuger
Figure 001



1 AFTER MODIFICATION CM 42443
QUICK RELEASE BLANKING CAP AND ITS ATTACHING CABLE ARE NOT FITTED

RB

3 in. Dia. Ground Connection with N.R.V.
Figure 002

Each ground connection is connected to the crossfeed piping between engines 1 and 2 and engines 3 and 4.
They are located under engine 1 (door 416JB) and under engine 3 (door 436JB).
They consist mainly of :

- A body attached to the crossfeed piping by six bolts. The body includes two clack valves.

RB
RB
RB

B. Operation

Under normal flight conditions, the two clack valves are held closed under their own weight and prevent air leakage from air conditioning system.
RB With external air supply connected, the air supply
RB pressure holds the check valves open.
RB
RB
RB
RB
RB
RB

4. Preconditioned Air Supply Valve Assy

A. Description

This valve assembly is located in the fuselage between Frames 66 and 67 and is accessible through door 151BB.
It consists of a hollow cylindrical body connected by a pipe to the distribution chamber. The body includes two lugs which serve for the connection of the ground air conditioning unit.

GROUND CONNECTION - REMOVAL/INSTALLATION

1. General

The removal/installation of the two ground connections is identical.

2. Ground Connection (Ref. Fig. 401)

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform	

B. Prepare

(1) Open engine cowl (engine 1 for LH ground connection, engine 3 for RH ground connection) (Ref. 71-00-00).

(2) Position access platform at engine.

C. Remove

(1) Hold ground connection (1) in position and remove
RB six screws (3). Retain washers (2) for reinstallation.
RB

(2) Remove ground connection.

(3) Remove seal (5).

D. Preparation of Replacement Component

(1) Install a new seal (5).

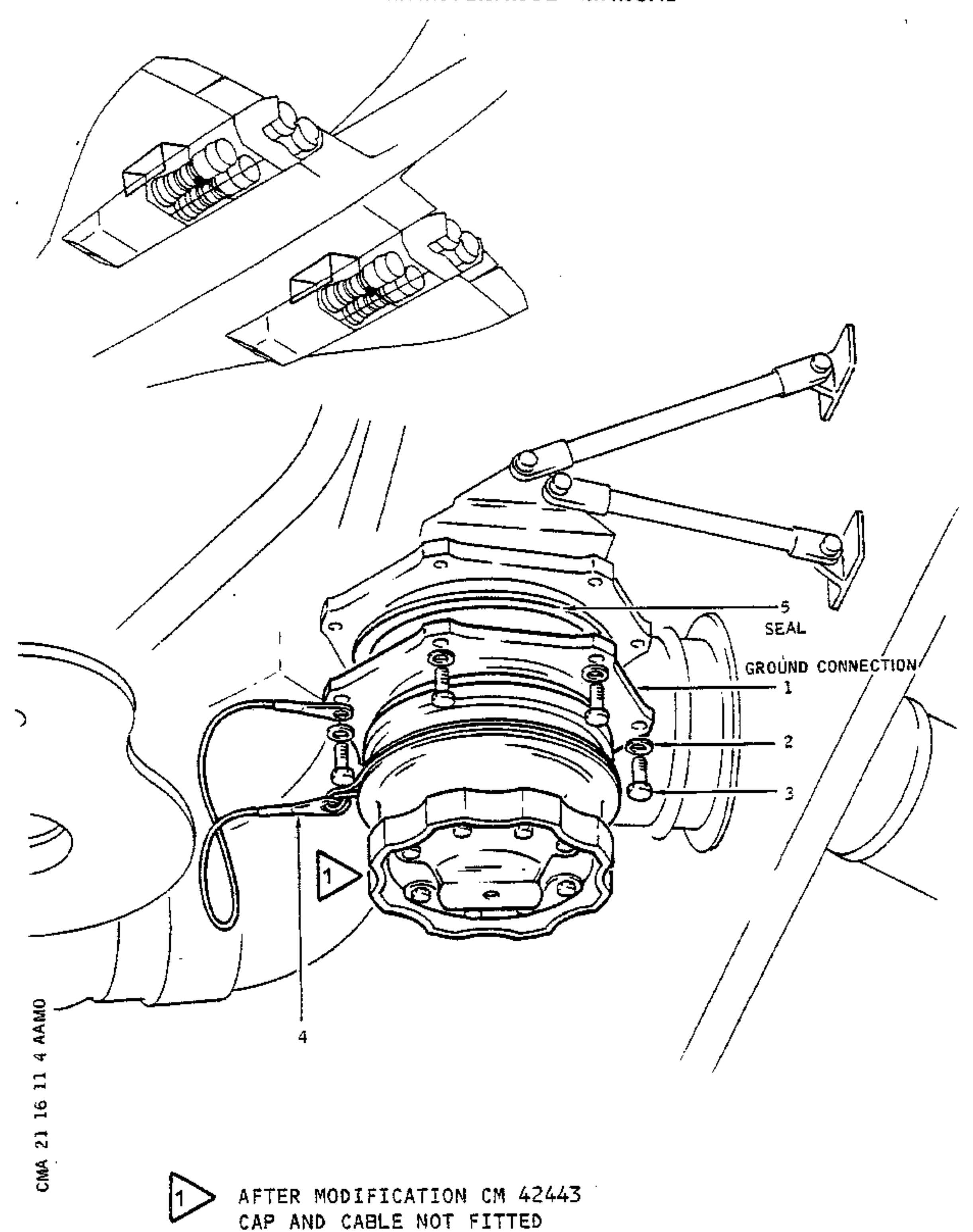
(2) If necessary, remove storage plugs from replacement ground connection.

(3) Make certain that replacement component bears no dent or corrosion traces.

(4) Make certain that the two clack valves operate freely.

E. Install

(1) Position ground connection (1).



1 AFTER MODIFICATION CM 42443
CAP AND CABLE NOT FITTED

RB

3 in. Dia. Ground Connection with N.R.V.
Figure 401

(2) Install screws (3) and washers (2). Interpose retaining cable end fitting.

<u>NOTE</u> : Make certain that screw length is compatible with grip-length.

(3) Tighten six screws (3).

F. Close-Up

(1) Remove access platform.

(2) Close engine cowl.

DUST CENTRIFUGER - REMOVAL/INSTALLATION

1. General

The dust centrifuger removal/installation procedure is identical for each air conditioning group. The dust centrifugers are located on the right hand side of engines 2 and 4, and on the left hand side of engines 1 and 3.

2. Dust Centrifuger (Ref. Fig. 401)

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform	

B. Prepare

(1) Position access platform.

(2) On nacelle, open access door :

415AL for Group 1 dust centrifuger
426AR for Group 2 dust centrifuger
435AL for Group 3 dust centrifuger
446AR for Group 4 dust centrifuger

C. Remove

(1) Loosen attachment clamp (2) nut. Open clamp.

(2) Loosen both nuts of attachment clamps (1) and (3).

(3) Carefully remove dust centrifuger (4).

D. Preparation of Replacement Component

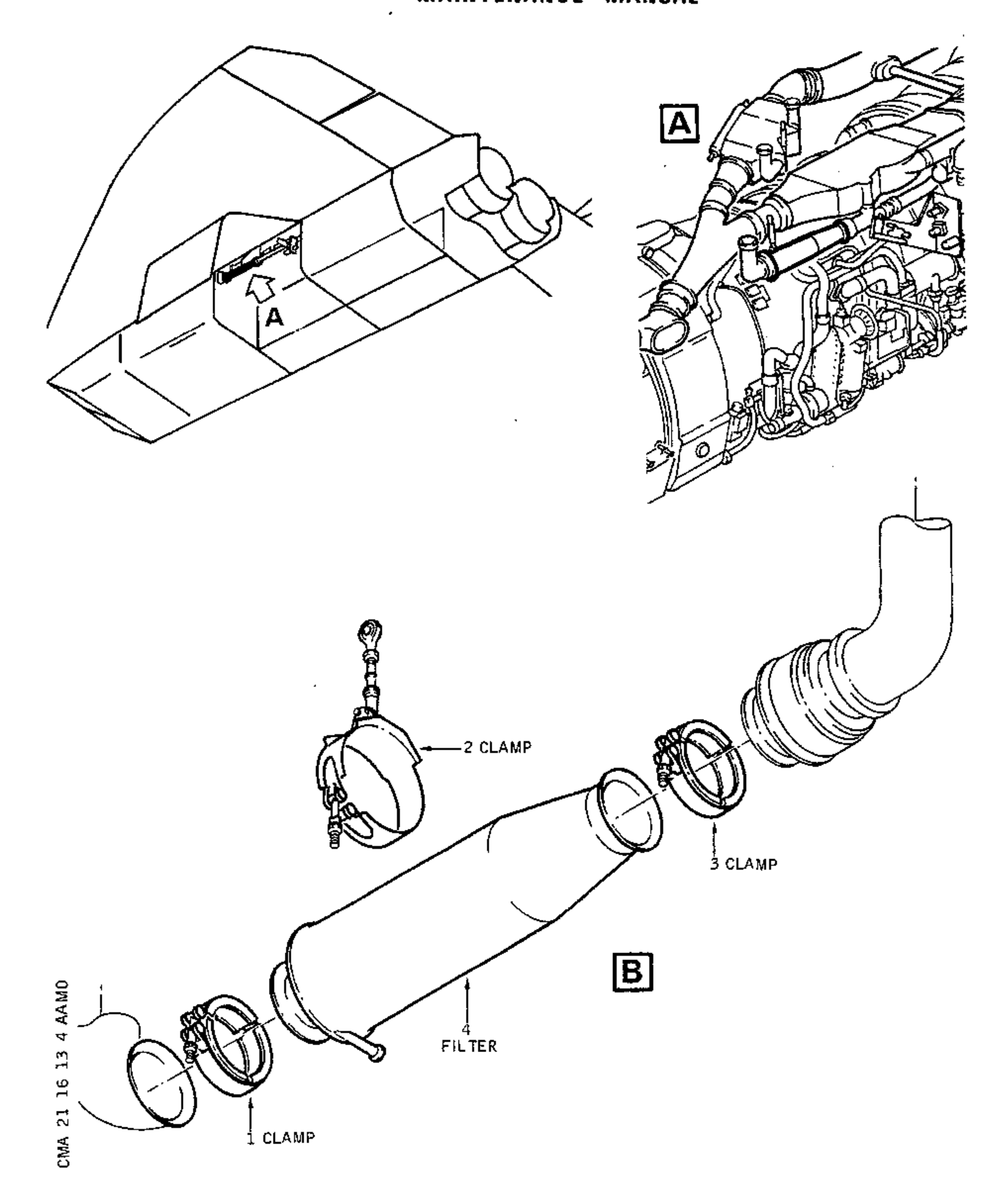
(1) Check that the replacement dust centrifuger is free from dents or traces of corrosion.

(2) Remove forward and aft blanking plugs.

E. Install

(1) Install dust centrifuger (4).

(2) Install clamp (2) without tightening it. If necessary



Dust Centrifuger
Figure 401

turn dust centrifuger in order that clamp tension adjuster engages in foolproofing key guide of dust centrifuger.

(3) Install clamps (1) and (3) ; engage tension adjusters.

(4) Tighten clamps (1) and (3) (Torque to 0.4-0.5 m.daN (35-45 lbf.in.)) and clamp (2) (Torque to 0.28-0.34 m.daN (25-30 lbf.in.)).

F. Close-Up

(1) Install dust centrifuger purge tube blanking plug if it has been removed.

(2) Check clamps for evidence of leakage (Ref. 21-16-13, Page 501, Adjustment/Test).

(3) Remove dust centrifuger purge tube.

(4) Close access door.

(5) Remove access platform.

DUST CENTRIFUGER - ADJUSTMENT/TEST

1. General

The purpose of this test is to check dust centrifuger for evidence of leakage after a removal/installation operation.

2. Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Ground Air Supply Unit : - Relative Minimum Pressure 2 Bars, airflow 0.4 Kg/sec. - Relative Maximum Pressure 4.5 Bars, airflow 0.6 Kg/sec. - Temperature must not exceed 300° C. - Circuit Breaker Safety Clips	

B. Prepare

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, S).

(2) Connect the ground air supply unit.

(3)

(a) Pressurize Fuel System

WARNING : OBSERVE FUEL SYSTEM SAFETY PRECAUTIONS DESCRIBED IN 28-00-00 AND 28-10-00.

NOTE : Pressurization assumes a minimum quantity of fuel of 2500kg in the appropriate feed tank (1, 2, 3, 4).

On centre console, place throttle control levers in SHUT position (lower mechanical stop). Check that crossfeed valves are closed and that associated magnetic indicators display vertical stripes.

With the LP VALVE switch locked at OPEN by the

switch guard, check that the associated magnetic indicator shows an in-line indication. Place the first of the three ENGINE FEED PUMPS control switches in ON position (MAIN PUMP)
Engine 1 Main Fuel Pump, for group 1
Engine 2 Main Fuel Pump, for group 2
Engine 3 Main Fuel Pump, for group 3
Engine 4 Main Fuel Pump, for group 4

Check that corresponding LOW PRESS indicator light goes off when pump operating pressure in reached.

WARNING : FUEL SYSTEM MUST NOT OPERATE MOVE THAN 2 HOURS.

(b) In case Fuel System cannot be used :
Trip, Safety and tag the following circuit breakers

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
For GRP 1 LH-UC WEIGHT SW A SYS SUP	1-213	G 292	M17
For GRP 2 LH-UC WEIGHT SW B SYS SUP	3-213	G 293	B 8
For GRP 3 RH-UC WEIGHT SW B SYS SUP		G 294	B 9
For GRP 4 RH-UC WEIGHT SW A SYS SUP	1-213	G 295	M18

WARNING : DURING TEST, FUEL EXGH WARNING LIGHT MAY ILLUMINATE. ON PANEL 2-214 PLACE FUEL VALVE. SWITCH IN OPEN POSITION (SELF-HOLDING CANCELLATION).

C. Test

(1) Start up ground air Supply unit.

(2) On AIR BLEED CONTROL panel 2-214 place CROSS BLEED switch of group to be tested in OPEN position.

(3) Place COND VALVE in ON position.

(4) Check filter mounting clamps for leakage.

(5) Place CROSS BLEED switch in SHUT position.

(6) Place COND VALVE switch in OFF position.

(7) Shut down ground air supply unit.

D. Close-up

(1) Disconnect ground air supply unit.

(2) In the case where the fuel system has been pressurized :

- Place ENGINE FEED PUMP switch in OFF position again. After a short delay LOW PRESS indicator light must come on.

If necessary, remove safety clips and tags and reset the circuit breaker tripped in paragraph 2B (3) (b). If FUEL EXCH warning comes on during the test after switching off ground air supply unit, wait for warning to go off and place FUEL VALVE switch in AUTO position.

(3) Disconnect electrical ground power unit.

SMOKE DETECTION - DESCRIPTION/OPERATION

1. General

R The smoke detection system is provided to prevent smoke pene-
R tration from air bleed or air generation systems into the cabin
The smoke detection system is identical for each air conditioning group.

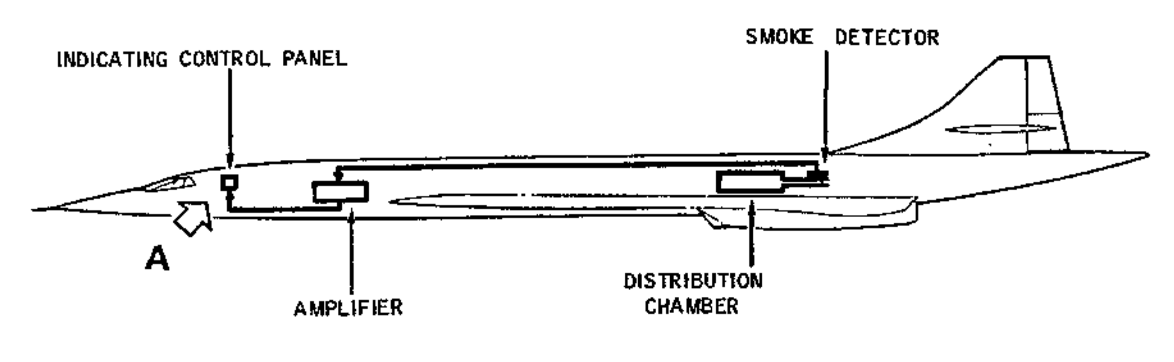
2. Description (Ref. Fig. 001)

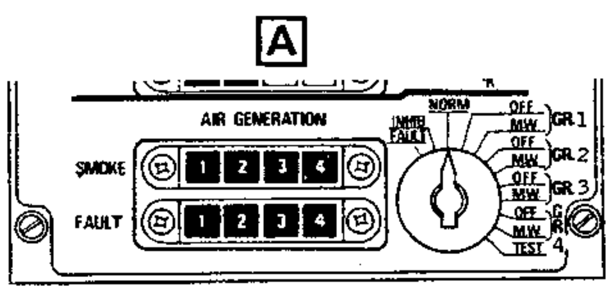
The smoke detector is installed in the air conditioning duct upstream of the distribution chamber.

R It is connected to an amplifier located in electronics racks.
R The smoke detector and amplifier are controlled by indicating and control devices located on Flight Engineer's panel 28-214.
R The control devices consist of :

- A SMOKE modular warning light with four modules identified 1, 2, 3, 4
R - A FAULT modular warning light with four modules identified 1, 2, 3, 4
- A rotary switch H699.

The smoke detection system is connected to the master warning panel and operates the air conditioning and mass flow control valves. The smoke detection system can be partially inhibited in order to make it possible to start up one group in the event of failure.





CMA 21 17 00 0 AAMO

Smoke Detection - Description
Figure 001

3. Detector - Smoke

The smoke detector consists of two chambers ionised by two small radioactive sources :

- The measuring chamber communicates with the air conditioning system,
- The reference chamber is closed in order to have a constant resistance value.

The two chambers are acted on by an electric field.

R When smoke particles penetrate the measuring chamber, ions providing current flow between the electrodes become heavy and R the equivalent resistance of the measuring chamber increases.

A transistor circuit transforms this increase of resistance into R an increase of current utilized by the detector.

R A second transistor circuit allows the smoke detector to be tested by decreasing power supply to ionised chambers until a

warning is simulated.

4. Amplifier

A. General

The smoke detector amplifier associated with the smoke detector, provides automatic fire detection.

It provides the following functions :

R (1) Energization of a warning light when the detector with
R which it is associated is subjected to a concentration
R of smoke.

R (2) Warning test of the general operation of the detection system.

R (3) Monitoring smoke detector power supply faults :

(a) Supply line cut out.

R (b) Short circuit of supply line.

(c) Faulty power supply.

R (4) The amplifier uses two power sources :

R (a) The aircraft 115 V - 400 Hz, supplying the detection system.

R (b) The aircraft 28 VDC, supplying the monitoring system.

B. Description (Ref. Fig. 002)

R The amplifier is a unit designed according to ARINC 404B specifications.

R It is designed to be installed in a rack with its front face visible.

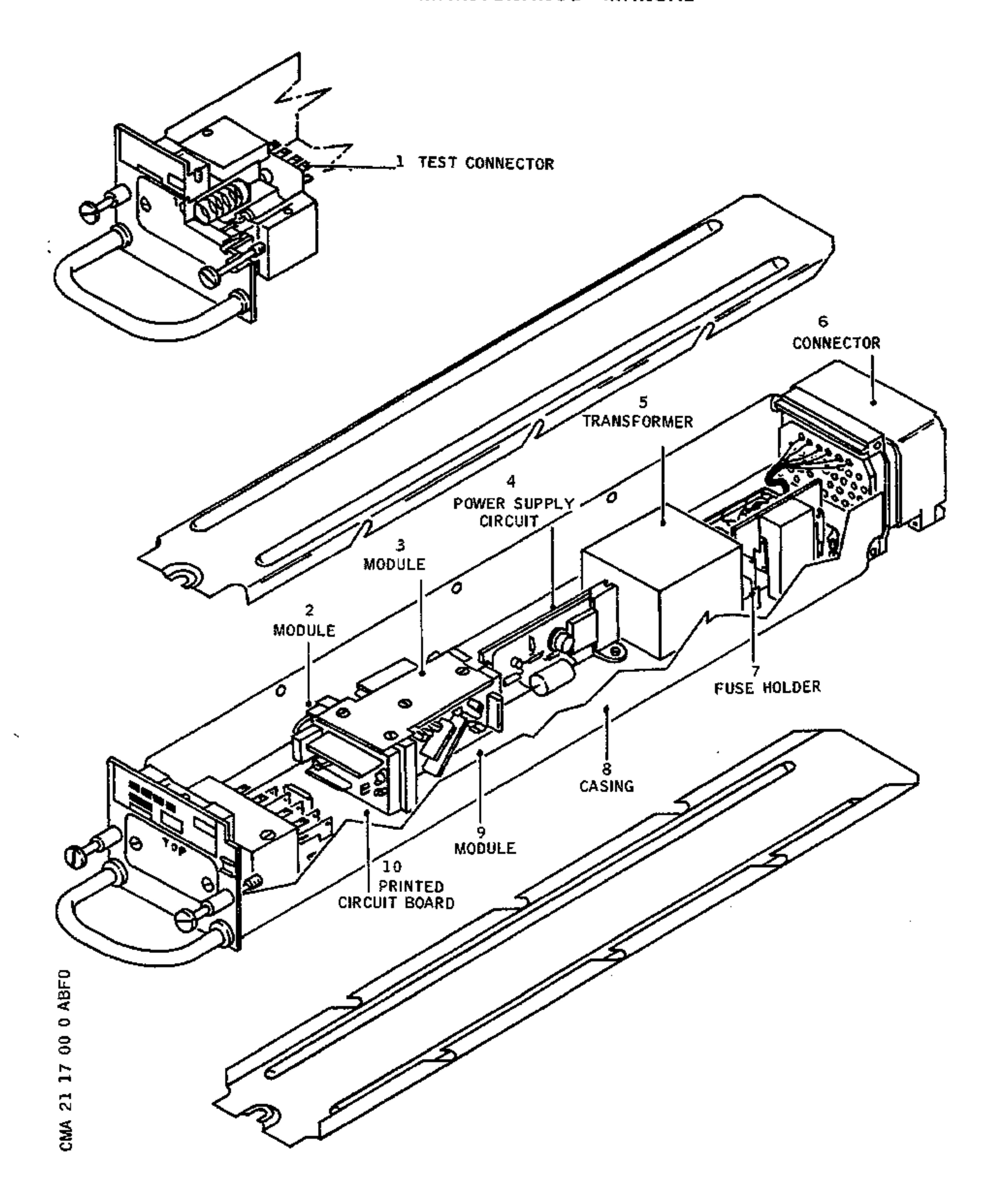
R This unit consists of three distinct parts :

(1) Front face

The front face consists of :

(a) A grip handle

(b) Two locking screws attaching the amplifier to the



Smoke Detection Amplifier - Description
R Figure 002

rack.

(c) A test module integral with the front face of the amplifier, by two screws.
R
R The test module is used for functionally testing the amplifier.

<u>CAUTION</u> : THE MODULE IS CORRECTLY POSITIONED WITH TOP INDICATION UPPERMOST.

(d) An identification plate and a label.

R (2) Protective covers.

(a) The RH and LH sides of the amplifier are protected
R by covers integral with the structure ; they are not removable.

(b) The upper and lower covers are removable and
R allow access to the various components inside the amplifier.

(3) Rear face

R The electrical connector is located on the rear of the amplifier.

(4) Inside components

R
R
R All the electrical and electronic units equipping the amplifier are interconnected on a mother board (10) attached to the metal structure of the unit.

This equipment consists of :

(a) 3 modules (2) (3) and (9)

R
R (b) A power supply system consisting of transformer (5) and supply circuit (4).

(c) A fuse holder (7).

(d) A test connector (1).

(e) A connector (6).

C. Operation (Ref. Fig.003 and 004)

The voltage required for operation of the amplifier
R detection is provided by the aircraft 115 V - 400 Hz network.

R The monitoring circuit is supplied by the aircraft 28V es-
R sential DC busbar.

(1) Operation principle of amplifier

The following figure shows the logic diagram of
R amplifier operation. This diagram represents the three
R functions of the amplifiers :

- Regulated power supply
- Warning detection
- Fault detection

(a) Regulated power supply

The detection circuit power supply is regulated
if the two following information signals are
R applied to gate (1) :

R - Presence of voltage at input E1.
R - Pulse to E2 input for memorization of the power
R supply switch on signal.

R When these two conditions are met they enable
operation of the complete circuit (6) and voltage
regulator (2) feeding the detection line.

Locking in ON position of regulated power supply
is subjected to the two following conditions :

- Continuity of detection line controlled by
circuit (1).
- Normal line current and correct isolation
controlled by circuit (4).

The ON information of regulated power supply is
memorized by circuit (7).

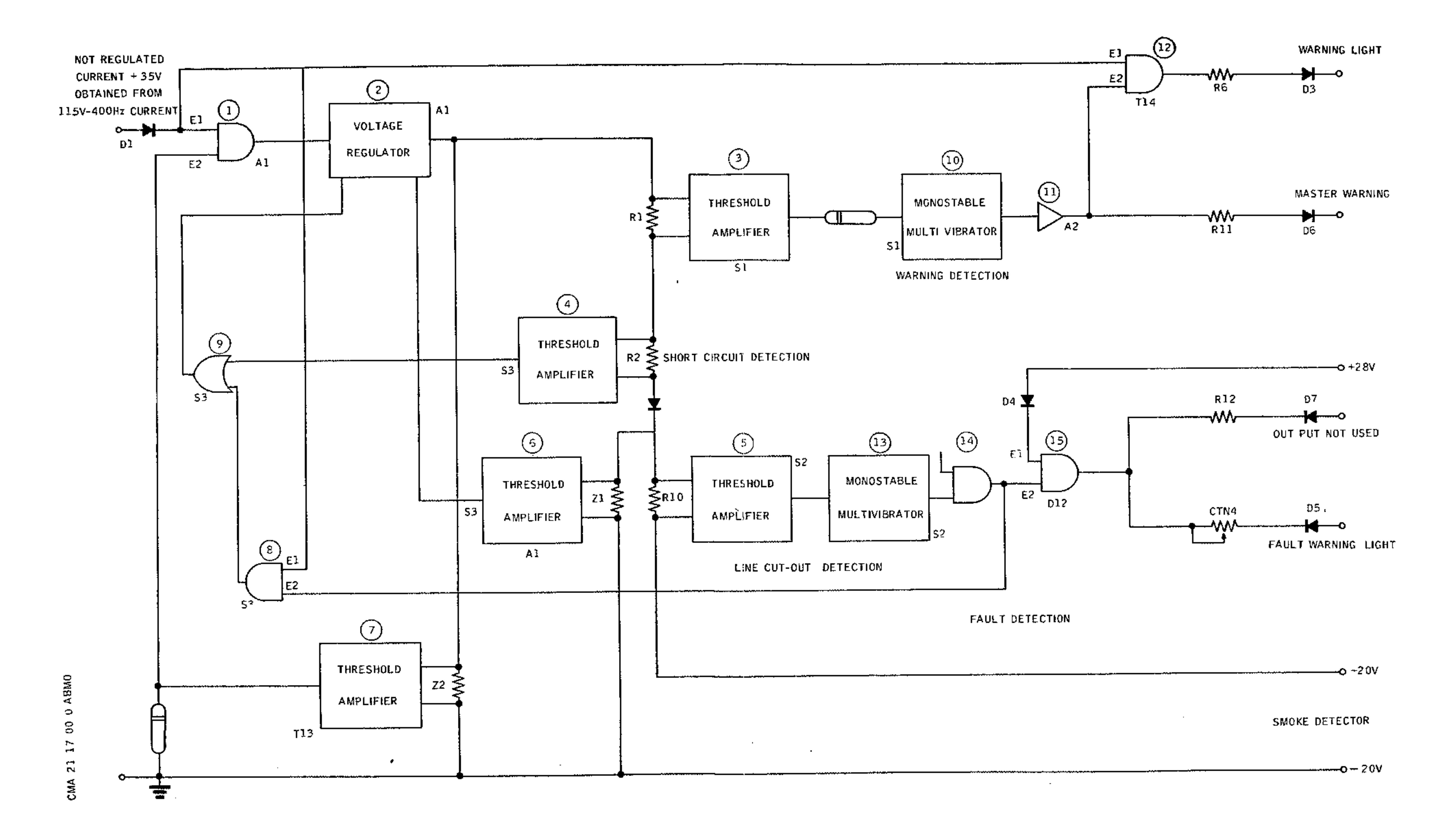
(b) Warning detection

If the detection line current exceeds 12 m A,
circuit (3) activates monostable multivibrator
(10). The output signal is amplified by circuit
(11) and applied :

- On the one hand to master warning panel.
- On the other hand to a power amplifier (12)
R energizing the warning light.

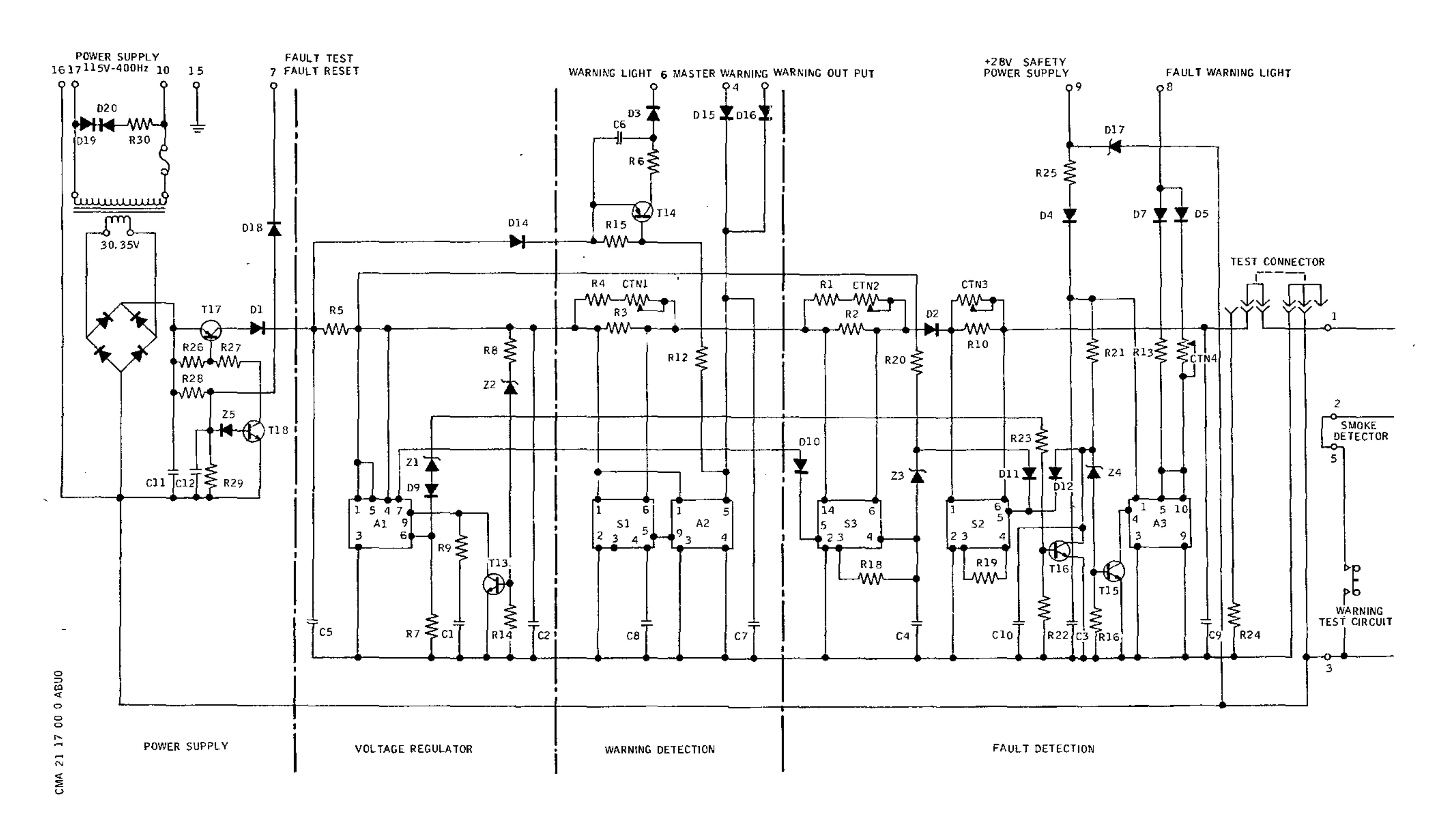
(c) Fault detection

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Smoke Detector Amplifier - Operation Principle
Figure 003

R



R

Smoke Detector Amplifier - Electrical Schematic
Figure 004

R There can be two kinds of detection line faults :

- line cut-out
- line short circuit

- Line cut-out

In normal operation monostable multivibrator (13) delivers a signal which, through gate (14) latches circuits (8) and (15).
R If the detection line current falls below
R 0.3 mA, circuit (5) sets monostable multivi-
R brator (13) in rest position. Circuits (8) and (15) are then unlatched.
Cancellation of information signal at input E2 associated with the presence of voltage at input
R E1 of circuit (8) causes, through circuit (9), the voltage regulator (2) to be latched.
Circuit (7) acting as the memory of circuit (1)
R latches and inhibits power supply operation.
Circuit (15) amplifies circuit (14) output to
R energize FAULT warning light.

R NOTE : Regulated power supply can operate again
R only when the 35 V supply has been
R temporarily cut-out

- Short circuits

If the detection line current exceeds 30 mA, circuit (4) latches voltage regulator (2) through
R gate (9). The line current tends to fall to zero and circuit (5) reacts as for line cut-out.

(2) Power supply (Ref. Fig. 004)

(a) Detection circuit power supply

The power supply consists of a step-down transformer which receives the 115 V - 400 Hz current, a rectifier bridge and a fault multivibrator,
R which in normal operation supplies power to the voltage regulator.

The circuit is protected by a fuse installed in
R series with the primary winding of transformer.

(b) Power supply of monitoring circuit

The monitoring circuit is supplied by the air-
R craft 28 V essential DC bushbar.

(3) Warning test (Ref. Fig. 004)

When the warning test is energized, the test circuit is grounded and triggers smoke detector warning.

(4) Fault test (Ref. Fig. 004)

The fault test acts by cutting out power supply. In normal operation, transistor T18 is conducting through resistor R28 and enables transistor T17 to energize the detection circuit.

When the fault test is energized it causes transistor T18 base to be grounded, which switches off transistor T18 and consequently transistor T17.

The reset function is obtained when the test action is cancelled or when the circuit is re-energized.

5. System Operation

The operation is identical for each smoke detection system. The operation is described for group 1. It is identical for groups 2 - 3 and 4.

A. General Operation

If smoke appears at detector level :

(1) SMOKE warning light module 1 comes on.

(2) AIR and SMOKE warning lights come on on master warning panel.

(3) The gong sounds

(4) Air conditioning and mass flow control valves close.

(5) Make certain that group is shut down by switching COND VALVE switch in OFF position
AIR warning light on master warning panel goes off.

(6) SMOKE warning light on Flight Engineer's panel and SMOKE warning light on master warning panel must go off when smoke has disappeared.

If after five minutes, with COND VALVE switch still in OFF position, the SMOKE warning lights are still illuminated, it may be a false warning. The air conditioning group may then be started again :

- Place rotary test switch in INHIB position
- Place COND VALVE switch in ON position.

The SMOKE warning lights on Flight Engineer's panel and on master warning panel remain illuminated as long as the false warning is on.
The SMOKE warning light on master warning panel may be manually cancelled.

Two points must be borne in mind if the last procedure is carried out :

(1) If, for any reason, the COND VALVE switch of one of the three remaining groups is switched to OFF then to ON position, the automatic shut down function of the air conditioning group will be inhibited in the event of smoke detection. The SMOKE warning lights on Flight Engineer's and master warning panels will remain on.

(2) If the inhibiting function does not operate (the corresponding circuit is faulty), the COND VALVE switch of the corresponding group may be placed in OFF position. By doing so, the inhibiting function on the other groups is overridden.

B. Operation of Logic Circuit Relay (Ref. Fig.005 and 006)

If smoke appears at the level of smoke detector 1H705, it causes :

(1) The + 28 voltage to appear at pin 6 of smoke detector amplifier 1H698

(2) Module 1 of indicator light H700 to illuminate on panel 28-214

(3) SMOKE warning light to illuminate on master warning panel

(4) Relay 1H696 to be energized

Special relay 1H696 is energized and transmits an AIR warning signal to master warning panel ; it cuts out fault relay 1H614 feedback. When the latter is de-energized, it energizes normal and emergency closing solenoids of air conditioning valve 1H645 ; it cuts out power supply to the opening solenoid of the air conditioning valve, which closes. When relay 1H614 is de-energized, it cuts out power supply to mass flow control valve 1H880 control relay.

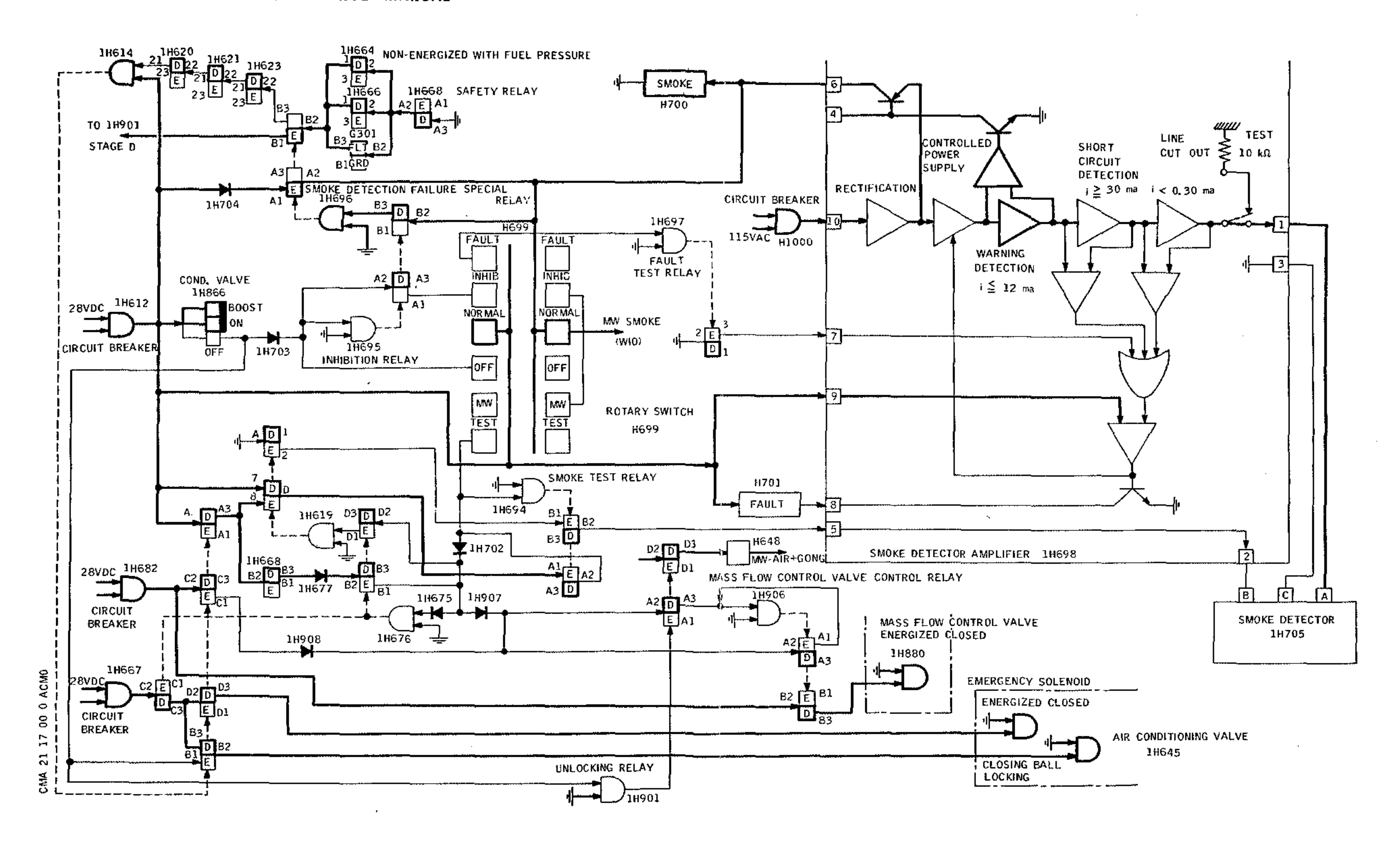
When relay 1H906 is non-energized, the closing solenoid of mass flow control valve 1H880 is energized.
The air conditioning group is then closed by the two valves in series, offering a double security.

Special fault relay 1H696 is locked at its stage A and the configuration described above is maintained as long as relay 1H695 is not energized.

If COND VALVE switch 1H866 is switched to the OFF position, relay 1H695 is energized. Relay 1H696 is not energized and the AIR warning light goes off on master warning panel.
SMOKE warning (module 1 on indicator light H700) and SMOKE warning on master warning panel are not latched.
They are cancelled as soon as smoke disappears, when air conditioning group may be started again by switching COND VALVE to ON.

If it is a false warning, there is a 28 volt voltage on terminal 6 of smoke detector amplifier 1H698. It is not possible to cancel SMOKE warning light on Flight Engineer's and master warning panels.

If rotary test switch H699 is placed in the INHIB position, relay 1H695 is maintained energized if switch 1H866 has previously been placed in the OFF position. Relay 1H696 is de-energized even if COND VALVE switch is placed again in ON or BOOST position.



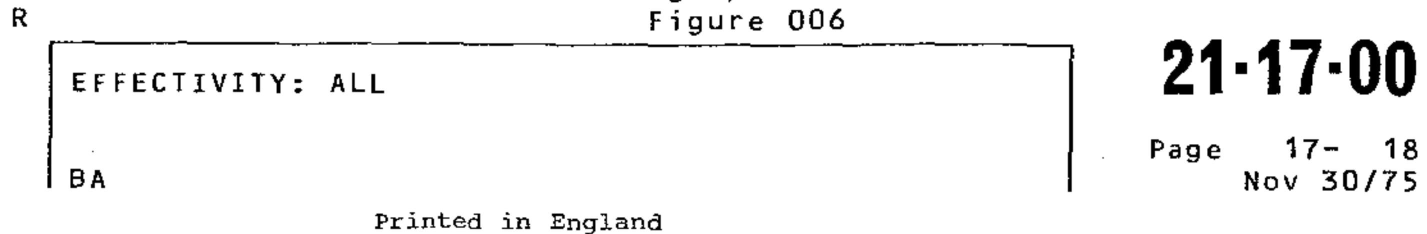
R

Normal Operation - SMOKE Warning Light
Figure 005

1H614
1H620
1H621
1H623
1H664 NON-ENERGIZED WITH FUEL PRESSURE
1H666
1H668 SAFETY RELAY
G301
FLT
GRD
TO 1H901
STAGE D
SMOKE
H700
1H704
SMOKE DETECTION FAILURE SPECIAL RELAY
1H696
H695
FAULT
INHIB
NORMAL
OFF
MW
TEST
1H697
FAULT TEST RELAY
CIRCUIT BREAKER
115VAC
H1000
RECTIFICATION
CONTROLLED POWER SUPPLY
WARNING DETECTION
$i \leq 12$ ma
SHORT CIRCUIT DETECTION
$i \leq 30$ ma
LINE CUTOUT
$i < 0.30$ ma
TEST
10 kΩ
28VDC
1H612
CIRCUIT BREAKER
COND. VALVE
1H866
BOOST
ON
OFF
1H703
1H695
INHIBITION RELAY
MW SMOKE
'WIO'
ROTARY SWITCH
1H699
SMOKE TEST RELAY
1H694
H701
FAULT
1H619
1H702
1H668
1H677
28VDC
1H682
CIRCUIT BREAKER
1H675
1H907
1H676
1H908
H648
MW-AIR+GONG
SMOKE DETECTOR AMPLIFIER 1H698
MASS FLOW CONTROL VALVE CONTROL RELAY
1H906
MASS FLOW CONTROL VALVE ENERGIZED CLOSED
1H880
SMOKE DETECTOR
1H705
28VDC
1H667
CIRCUIT BREAKER
EMERGENCY SOLENOID
ENERGIZED CLOSED
AIR CONDITIONING VALVE
1H645
CLOSING BALL LOCKING
UNLOCKING RELAY
1H901
CMA 21 17 00 0 AEMO

General Operation - INHIB Function After SMOKE
Warning Operation
Figure 006

R


EFFECTIVITY: ALL

BA

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6. Operation Under Test

A. General Operation

The test can be carried out with the system in operation. However, it is normally carried out when the system is not in operation, with COND VALVE switches placed in ON position.

When rotary test switch is in TEST position, the four SMOKE warning light modules come on.
On master warning panel SMOKE warning does not come on, AIR warning (indicator light and gong) operate.
When rotary switch is placed in TEST position, nothing happens in OFF and MW (Master Warning) positions.

R Then place rotary test switch in MWG4 position : SMOKE master warning is energized (warning light and gong). On Flight Engineer's panel, SMOKE warning light, module 1, 2, 3, 4, is illuminated.
R GR4 rotary test switch is in OFF GR4 position : module 4 goes off. SMOKE master warning light goes off.

R Place rotary test switch in MW GR3 position :
On Flight Engineer's panel SMOKE warning light modules 1, 2, 3 are illuminated. AIR warning light on master warning panel comes on.
MW SMOKE warning light comes on and gong sounds.

R Rotary test switch is placed in OFF group 3 position :
R Module 3 goes off, SMOKE warning light goes off. The pro-
R cedure is the same for GR 2 and GR 1 positions until all SMOKE warning light modules are extinguished.

B. Operation of the Relay Logic Circuit (Ref. Fig. 007)

Rotary test switch H699 is in TEST position.
Relay 1H694 is energized. 28 volt current flows across diode 1H702, energizes relay 1H676 which prevents air conditioning valve 1H645 from closing. The same 28 volt current flowing through diode 1H907 energizes relay 1H906 to prevent mass flow control valve from closing.

When relay 1H676 is energized its stage D energizes time delay relay 1H619 ; terminal 5 of smoke detector amplifier 1H698 and contact B1 of relay 1H694 are grounded through stage 1 of relay 1H619.

Smoke detector terminal B and amplifier terminal C are also grounded. Current then flows through the detector and a voltage of + 28V appears at terminal 6 of amplifier 1H698.

R Module 1 of indicator light H700 comes on, relay 1H6976 is energized. AIR warning light comes on and fault relay is de-energized. The test latches when stage A of relay 1H614 is not energized and when stage D of relay 1H619 is energized.

R Place rotary test switch in MW GR1 position.
Test remains latched ; this position makes it possible to check that relay 1H696 and fault relay 1H614 operate correctly ; if they do not operate the test does not latch.
Terminal 6 of amplifier is still supplied with 28V current and only master warning is supplied through selector switch.
Check connection between GR1 and SMOKE master warning ; the connection GR1 AIR master warning is checked during overheat test.

R
R Rotary test switch is in OFF GR1 position : Inhibition relay 1H695 is energized (That of groups 2, 3, 4 remain non-energized). B stage of relay 1H695 cuts out power supply to relay 1H696 and fault relay energizes again. Relays 1H676 1H619 de-energize again. SMOKE warning light module 1 goes off, and SMOKE master warning light goes off.

7. Monitoring - FAULT Warning Operation (Ref. Fig. 008)

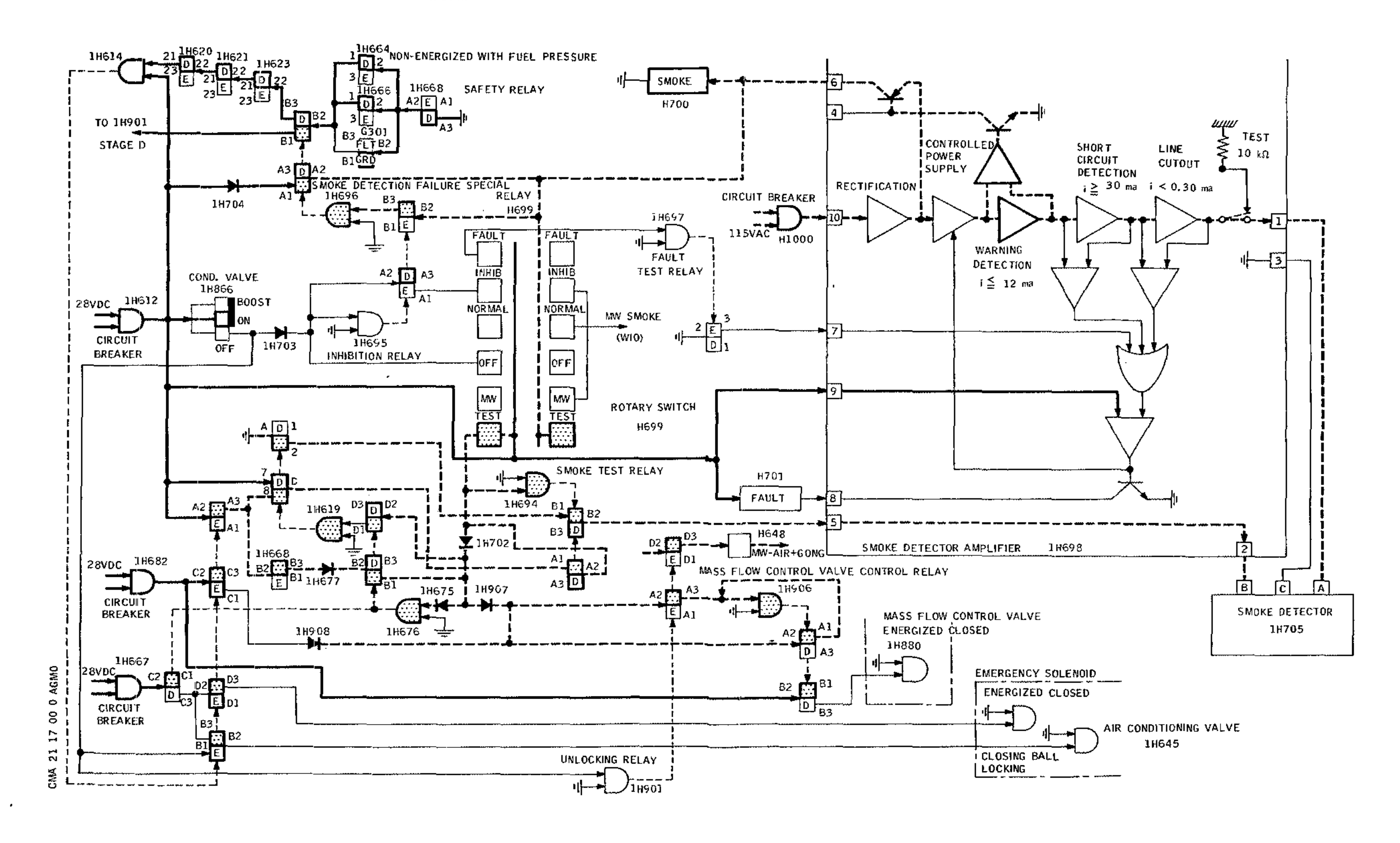
If, during normal operation of the system, a break in a line or a short circuit occurs on aircraft network or on smoke detector or amplifier, the FAULT warning light corresponding to the faulty group comes on. Terminal A of amplifier 1H698 (connected to indicator light H701) is grounded.

R It is possible to ensure that fault no longer exists (reset function) by placing rotary test switch in FAULT then in NORM position.

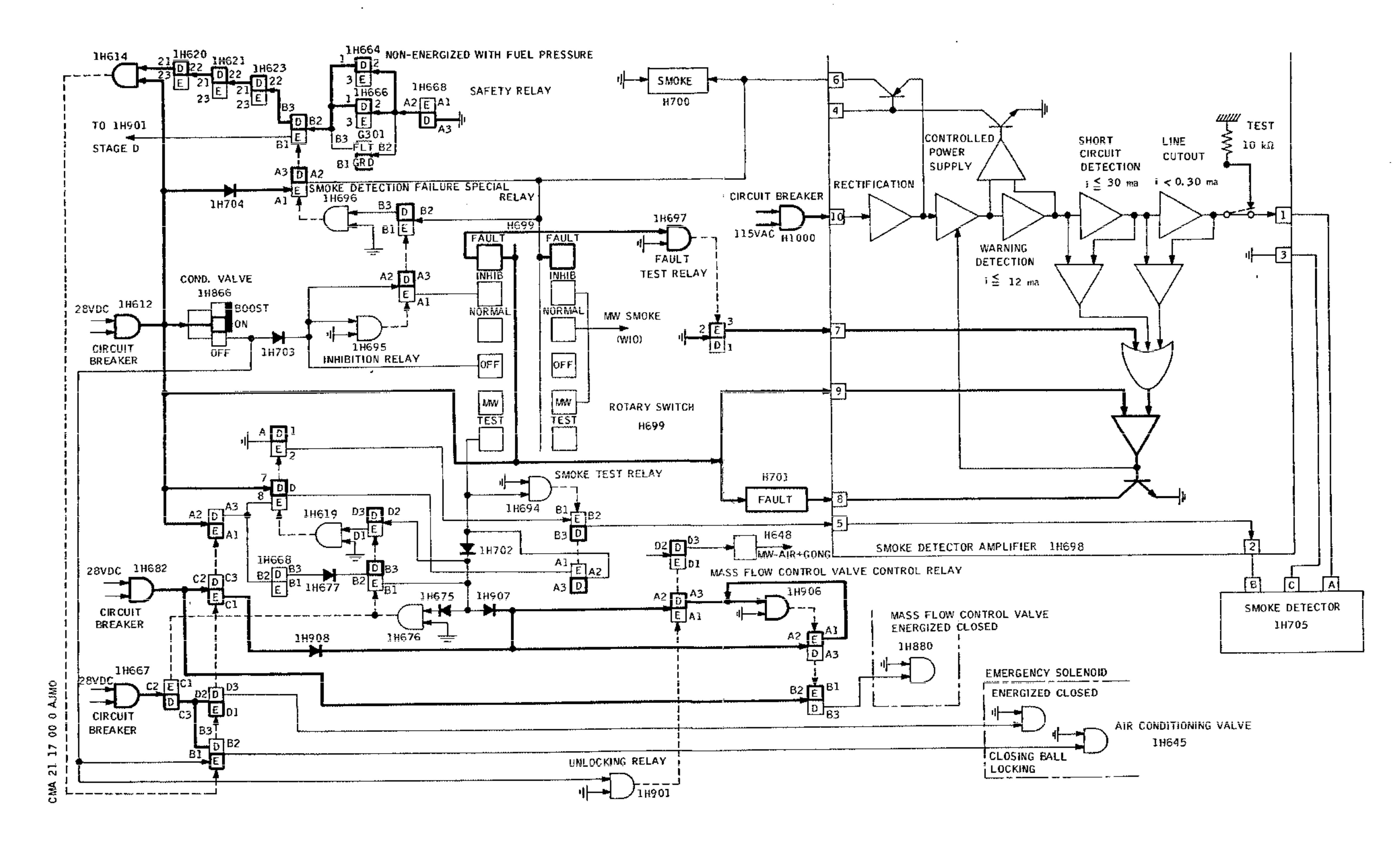
R If fault no longer exists, FAULT warning light goes off after switch has been operated and smoke detection function is ensured again.

R The test of smoke detection function can be carried out by placing rotary test switch H699 in FAULT position. Relay 1H697 is energized which enables relay 1H698 to be grounded. The amplifier transmits a fault signal : Terminal 8 of relay 1H698 is grounded.

This test is simultaneously carried out for the four groups. The four modules of H701 come on at the same time.



Operation in Test Configuration
Figure 007



Monitoring - Fault Operation
Figure 008

SMOKE DETECTION - TROUBLE SHOOTING

WARNING : OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED IN 24-00-00, SERVICING.

1. General

The following trouble shooting procedures are intended to enable faults found in flight or on the ground to be quickly rectified.
The defect can be isolated with the aid of the trouble shooting procedures and traced through OK and NOT OK paths to the appropriate charts. All procedures dealing with trouble shooting are based on the assumption that electrical wiring is serviceable. If the fault is not rectified check the wiring in accordance with the Wiring Diagram Manual.
The system consists of 4 identical groups : trouble Shooting is accomplished for group 4.
Designation, identification and location of components corres-
R ponding to groups 3, 2 and 1 are indicated in the component
R identification table. (e.g. GR1, 1H694 - GR2 2H694 - GR3 3H 694,
R GR4 H 694).
The SMOKE test is carried out from group 4 to groups 3, 2 and 1.

Trouble Shooting shall be carried out with aircraft in ground configuration, shock absorbers compressed.

2. Prepare

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Multimeter	

B.

R (1) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 AIR COND VALVE CLOSE & AIR GEN IND	1-213	1H 612	D11

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP2 AIR COND VALVE CLOSE & AIR GEN IND	5-213	2H 612	A 9
GRP3 AIR COND VALVE CLOSE & AIR GEN IND	15-215	3H 612	A 3
GRP4 AIR COND VALVE CLOSE & AIR GEN IND	15-216	4H 612	A24
GRP1 TEMP SELECTOR AUTO SUP & CONT	2-213	H1000	B17
GRP2 TEMP SELECTOR AUTO SUP & CONT	4-213	H1001	E11
GRP3 TEMP SELECTOR AUTO SUP & CONT	2-213	H1002	G16
GRP4 TEMP SELECTOR AUTO SUP & CONT	4-213	H1003	B12

(2) Connect electrical ground power unit and energize the aircraft electrical network.

3. Trouble Shooting

```
   ******************************************************
   * During smoke detection test, SMOKE test is :       *
   ******************************************************
        ||     |       -----------------------------------------------------
R       ||     |      | PRIM and SEC tests are correct                      |
        ||     |      | COND VALVE switch in ON or BOOST position           |
        OK   NOT OK---| TEST SMOKE rotary test switch in TEST position      |
        ||            | SMOKE GR4 warning light extinguished                |
R       ||            | SMOKE GR3 2 1 warning lights illuminated            |
        ||            | Ref. Chart 101                                      |
        ||             -----------------------------------------------------
        ||
   *******************************************************
   * MW (Master Warning) test is :                       *
   *******************************************************
        ||     |       -----------------------------------------------------
        ||     |      | COND VALVE 4 switch in ON or BOOST position         |
        OK   NOT OK   | Rotary test switch in MW4 position. No MW           |
        ||     |------| SMOKE GR4 warning light extinguished.               |
        ||     |      | Ref. Chart 102                                      |
        ||     |       -----------------------------------------------------
        ||     |       -----------------------------------------------------
        ||     |      | COND VALVE 4 switch in ON or BOOST position         |
        ||     |      | Rotary test switch in MW4 position                  |
        ||     |      | NO SMOKE master warning                             |
        ||     -------| SMOKE GR4 warning light remains illuminated         |
        ||            | Ref. Chart 103                                      |
        ||             -----------------------------------------------------
        ||
   ******************************************************
   * The OFF test is :                                  *
   ******************************************************
        ||     |       -----------------------------------------------------
        ||     |      | COND VALVE 4 switch in ON or BOOST position         |
        ||     |      | SMOKE rotary test switch in OFF position            |
R       OK   NOT OK   | SMOKE 4 warning light remains illuminated.          |
        ||     |------| COND VALVE 4 switch in OFF position.                |
R       ||            | SMOKE warning light goes off.                       |
R       ||            | Ref. chart 104                                      |
        ||             -----------------------------------------------------
        ||
   ******************************************************
   * FAULT test is :                                    *
   ******************************************************
        ||     |       -----------------------------------------------------
        ||     |      | SMOKE rotary test switch in FAUT position           |
        OK   NOT OK   | FAULT GR4 warning light extinguished                |
        ||     |------| FAULT GR3, 2, 1, warning lights illuminated         |
        ||            | Ref Chart 105                                       |
```

INTENTIONALLY BLANK

```
        ||
    *****************************************************
R   * Engine running FAULT warning light is extinguished*
    *****************************************************
        ||     |            ---------------------------------------------------
        OK     |           | SMOKE rotary test switch in NORMAL position      |
R       ||     NOT OK--| FAULT GR4 warning light illuminated              |
        ||                 | Ref Chart 106                                    |
        ||                  ---------------------------------------------------
    *****************************************************
    * Smoke with SMOKE warning                          *
    *****************************************************
        ||                  ---------------------------------------------------
        ||                 | Smoke in cabin or flight compartment             |
        ||                 | COND VALVE 4 switch in ON or BOOST position      |
        ||                 | SMOKE GR4 warning light illuminated.             |
        OK                 | SMOKE and AIR warning lights illuminated on      |
        ||-----------------| master warning panel                             |
        ||                 | COND VALVE4 magnetic indicator in SHUT position|
        ||                 | Ref Chart 107                                    |
        ||                  ---------------------------------------------------
    *****************************************************
    * Smoke with no SMOKE warning                       *
    *****************************************************
        ||                  ---------------------------------------------------
        ||                 | COND VALVE 4 switch in ON or BOOST position      |
R       ||                 | Smoke in aircraft                                |
        ||                 | SMOKE 4 warning light does not come on           |
R       OK                 | AIR and SMOKE warning lights do not come on      |
        ||-----------------| on master warning panel                          |
R       ||                 | Ref. chart 108                                   |
        ||                  ---------------------------------------------------
    *****************************************************
    * SMOKE warning light remains illuminated after     *
    * switching of COND VALVE switch in OFF position    *
    *****************************************************
        ||     |            ---------------------------------------------------
        ||     |           | SMOKE GR4 warning light illuminated              |
        ||     |           | COND VALVE magnetic indicator in SHUT position   |
        ||     |           | COND VALVE 4 switch in OFF position              |
        OK   NOT OK----| SMOKE warning light remains illuminated          |
        ||                 | SMOKE warning light remains illuminated on       |
        ||                 | master warning panel                             |
R       ||                 | Ref. Chart 109                                   |
        ||                  ---------------------------------------------------
        ||
        ||
        ||
        ||
        ||
```

```
      ||
*****************************************************
* Rotary test switch is placed in INHIB position    *
* and SMOKE GR4 warning light remains illuminated   *
* (group opening)                                   *
*****************************************************
      ||                   ----------------------------------------------
      OK                   | SMOKE rotary test switch in INHIB position   |
      ||                   | COND VALVE switch in ON position             |
      ||-------------------| COND VALVE magnetic indicator in OPEN position |
R     ||                   | SMOKE GR4 warning light comes on             |
      ||                   | SMOKE warning light illuminated on master    |
      ||                   | warning panel                                |
R     ||                   | Ref. Chart 110                               |
      ||                   ----------------------------------------------
*****************************************************
* Rotary test switch is placed in INHIB position    *
* and SMOKE GR4 warning light remains illuminated   *
* The group remains shut down)                      *
* The group opens when rotary test switch is        *
* placed in OFF position                            *
*****************************************************
      ||                   ----------------------------------------------
      ||                   | SMOKE GR4 warning light illuminated          |
      OK                   | SMOKE rotary test switch in INHIB position   |
      ||                   | COND VALVE switch in ON position             |
      ||-------------------| COND VALVE magnetic indicator in SHUT position |
      ||                   | SMOKE rotary test switch in OFF4 position    |
      ||                   | COND VALVE magnetic indicator in OPEN position |
      ||                   | Ref. chart 111                               |
      ||                   ----------------------------------------------
*****************************************************
* Air Conditioning group is not cut out if SMOKE    *
* warning light comes on                            *
*****************************************************
      ||                   ----------------------------------------------
      ||                   | COND VALVE GR4 switch in ON or BOOST position |
      ||                   | SMOKE warning light illuminated              |
      ||                   | SMOKE warning light illuminated on master    |
      ---------------------| warning panel                                |
                           | COND VALVE magnetic indicator in OPEN position |
R                          | Ref. chart 112                               |
                           ----------------------------------------------
```

```
   **************************************-------------------------------
R  * PRIM AND SEC TESTS ARE CORRECT      *| GROUND EQUIPMENT REQUIRED  |
R  * SMOKE ROTARY TEST SWITCH [6] IN     *|----------------------------|
R  * TEST POSITION                       *| DESCRIPTION       PART NO. |
R  * SMOKE GR4 WARNING LIGHT             *|----------------------------|
R  * EXTINGUISHED                        *| MULTIMETER                 |
R  * SMOKE GR3, 2, 1 WARNING LIGHTS      *-------------------------------
R  * ILLUMINATED                         *
   **************************************


   **************************************
R  * Remove amplifier 4H698 [6] in       *
R  * SMOKE rotary test switch [6] in     *
R  * TEST position                       *
R  * Check resistance between terminal 5*
R  * of electrical connector 4H698 and   *
R  * aircraft ground                     *
   **************************************
       ||                   |
R    infinity          0 to 10 ohms
       ||                   |
       ||  ***************************
R      ||  * Rotary test switch in OFF  *
R      ||  * position                   *
R      ||  * Replace amplifier 4H698    *
R      ||  * Rotary test switch in TEST *
R      ||  * position                   *
R      ||  * SMOKE 4 warning light comes*
R      ||  * on                         *
       ||  ***************************
       ||       |           |            --------------------------------
R      ||       |           ------------| Amplifier 4H698 was faulty |
       ||       |                        --------------------------------
       ||       |                        --------------------------------
R      ||       ------------------------| Replace smoke detector [10]|
       ||                                --------------------------------
   **************************************
R  * On unit 11-123 [14], on test        *
R  * connector UT1894, measure the       *
R  * voltage between terminal C15 and    *
R  * aircraft ground                     *
   **************************************-------------------------------
R      ||                                 | Replace rotary test        |
R      ||                                 | switch H699 [6]            |
       ||                                 -------------------------------
```

R Chart 101 Sheet 1 of 2

R Trip circuit breaker 4H612.
R Using a multimeter check diode
R 4H702 in unit 11-123

R Replace diode 4H702

R Replace relay 4H694

R	GROUP	CONNECTOR	TERMINALS	POSITION
R	GR1	UT 1894	5C	11-123
R	GR2	UT 1895	5C	11-123
R	GR3	UT 1895	15C	11-123
R	GR4	UT 1894	15C	11-123

R Chart 101 Sheet 1 of 2

```
***************************************-----------------------------------
* COND VALVE 4 switch IN ON OR        *| GROUND EQUIPMENT REQUIRED        |
* BOOST POSITION                      *-----------------------------------
* ROTARY TEST SWITCH IN MW4 POSITION  *| DESCRIPTION        PART NO       |
* NO MASTER WARNING                   *-----------------------------------
* SMOKE GR4 WARNING LIGHT             *| MULTIMETER                       |
* EXTINGUISHED                        *-----------------------------------
***************************************
*****************************************************
* Place rotary test switch [6] again in test        *
* position                                          *
* On test connector UT1894 in GRND PWR PNL 11-123   *
* [14] measure voltage between terminal C14 and     *
* aircraft ground                                   *
*****************************************************
        ||                 |            ------------------------------
        28V                0V           | Replace relay 4H695 [2] in |
        ||                 |------------| GRND PWR PNL 11-123 [14]   |
        ||                              ------------------------------
***************************************
R  * Rip circuit breakers 4H612 [13] and*
R  * H 400z [14]                        *
* In GRND PWR PANEL 11-123 [14]       *
* Check diode 4H704 [9]               *
***************************************
        ||                 |
        ||                 |            ------------------------------
        OK               NOT OK---------| Replace diode 4H704 [9]    |
        ||                              ------------------------------
        ||
        ||                              ------------------------------
        ||------------------------------| Replace relay 4H696 [3] in |
                                        | GRND PWR PNL 11-123 [14]   |
                                        ------------------------------
```

Chart 102

```
*************************************-------------------------------
* COND VALVE 4 IN ON OR BOOST       *| GROUND EQUIPMENT REQUIRED  |
* POSITION                          *-------------------------------
* ROTARY TEST SWITCH IN MW4         *| DESCRIPTION        PART NO |
* NO SMOKE MASTER WARNING           *-------------------------------
* SMOKE WARNING LIGHT REMAINS       *| MULTIMETER                 |
* ILLUMINATED                       *------------------------------
*************************************

*************************************
* Rotary test switch [6] in MW4     *
* position, open panel 28-214       *
* At the back of SMOKE rotary test  *
* switch, disconnect connector      *
* U2240A                            *
* On GRND PWR PNL [14] side on      *
* connector U2240B, check continuity *
* between terminals W and T         *
*************************************
        |                |
        |                |
        |                |
    CORRECT          INCORRECT        -----------------------------
        |                |            | Replace rotary test        |
        |                |------------| switch [6]                 |
        |                             -----------------------------
        |
        |
        |
        |                             -----------------------------
        |-----------------------------| Ref. Master warning SMOKE  |
                                      | trouble shooting           |
                                      -----------------------------
```

Chart 103

```
*************************************
* COND VALVE 4 SWITCH IN ON OR BOOST *
* POSITION                          *
* SMOKE ROTARY TEST SWITCH IN OFF   *
* POSITION                          *
* SMOKE WARNING LIGHT REMAINS       *
* ILLUMINATED                       *
* COND VALVE 4 SWITCH IN OFF POSITION*
* SMOKE WARNING LIGHT GOES OFF      *
*************************************
                 |
                 |                   -----------------------------
                 |-------------------| Replace rotary test       |
                                     | switch [6]                |
                                     -----------------------------
```

Chart 104

```
    ************************************-------------------------------
    * SMOKE ROTARY TEST SWITCH IN FAULT *| GROUND EQUIPMENT REQUIRED   |
    * POSITION                          *-------------------------------
R   * FAULT GR4 WARNING LIGHT           *| DESCRIPTION        PART NO  |
    * EXTINGUISHED                      *-------------------------------
R   * FAULT GR 3, 2, 1 WARNING LIGHTS   *| MULTIMETER                  |
    * ILLUMINATED                       *-------------------------------
    *************************************

    *************************************
    * Remove group 4 amplifier [5]      *
    * Rotary test switch is in FAULT    *
    * position                          *
    * On connector 4H698A, check        *
    * continuity between terminal 7 and *
    * aircraft ground                   *
    *************************************
             ||            |
         INCORRECT      CORRECT         -------------------------------
             ||            |-------------|Replace group4 amplifier [5]|
             ||                         -------------------------------
    *************************************
    * In GRND PWR PNL 11-123 [14], on   *
    * test connector UT 1894, check     *
    * voltage between terminal C16 and  *
    * aircraft ground                   *
    *************************************
             ||            |
            28V         0 VOLT          -------------------------------
             ||            |-------------| Replace rotary test         |
             ||                         | switch [6]                  |
             ||                         -------------------------------
             ||
             ||                         -------------------------------
             ||--------------------------| Replace relay 4H697 [4]    |
                                        -------------------------------
```

Chart 105

```
*************************************-------------------------------
* FAULT GR4 WARNING LIGHT ILLUMINATED*| GROUND EQUIPMENT REQUIRED   |
* SMOKE ROTARY TEST SWITCH IN NORMAL *-------------------------------
* POSITION                           *| DESCRIPTION       PART NO   |
*************************************-------------------------------
                                      | MULTIMETER                  |
                                      -------------------------------

********************************************
* Remove group 4 amplifier [5] from its rack*
* on rack connector measure resistance     *
* between terminal 7 and aircraft ground   *
********************************************
        ||               |
        ||               |                  -------------------------------
    Infinity             0 to 5 ohms-| Replace relay [4]           |
        ||                                  -------------------------------
*************************************
* Changeover group 4 and 3 amplifiers*
* [5]                                *
* When amplifiers are changed over   *
* FAULT GR4 is still illuminated     *
*************************************
        ||               |
        ||               |                  -------------------------------
       YES               NO----------| Replace group 4 amplifier   |
        ||                                  | [5].                        |
        ||                                  -------------------------------
        ||
*************************************
* Place amplifiers in their location *
* Switch over connectors of group 3  *
* and 4 smoke detectors [10]         *
* When connectors are switched over  *
* FAULT GR4 warning light remains    *
* illuminated                        *
*************************************
        ||               |                  -------------------------------
       YES               NO----------| Replace group 4 smoke       |
        ||                                  | detector [10]               |
        ||                                  -------------------------------
        ||                                  -------------------------------
        ||                                  | Repair wiring between       |
        ||---------------------------| amplifier and smoke         |
                                            | detector                    |
                                            | WDM 21-17-41                |
                                            -------------------------------
```

Chart 106

```
   *************************************
R  * SMOKE IN CABIN OR FLIGHT          *
   * COMPARTMENT                       *
   * COND VALVE 4 SWITCH IN ON OR BOOST *
   * POSITION                          *
   * SMOKE GR4 WARNING LIGHT ILLUMINATED*
   * SMOKE AND AIR WARNING LIGHTS      *
   * ILLUMINATED ON MASTER WARNING PANEL*
R  * COND VALVE 4 MAGNETIC INDICATOR IN *
   * SHUT POSITION                     *
   *************************************
                   |
                   |               ------------------------------
                   |               | Check oil level in CAU [12]|
                   |               | If level is normal, check  |
                   |               | for evidence of oil in     |
                   |---------------| tubings ; clean then       |
                                   | (MM  Chap 5-56-00)         |
                                   | If oil level is too low,   |
R                                  | replace CAU [12]           |
R                                  | (Ref. 21-12-35, Removal/   |
R                                  | Installation)              |
R                                  | and clean tubings          |
R                                  | (Ref. 5-56-00)             |
R                                  | (Ref. 21-12-35, Removal/   |
R                                  | Installation)              |
                                   ------------------------------
```

Chart 107

```
    ***************************************
R   * COND VALVE SWITCH 4 IN ON OR        *
R   * BOOST POSITION                      *
R   * SMOKE IN AIRCRAFT                   *
R   * SMOKE 4 WARNING LIGHT DOES NOT      *
R   * COME ON                             *
R   * AIR AND SMOKE WARNING LIGHTS        *
R   * DO NOT COME ON ON MASTER WARNING    *
R   * PANEL                               *
    ***************************************
    ***************************************
R   * If there is smoke                   *
    ***************************************
         |          |                      ------------------------------
R        |          |----------------------| Ref. Chart 107             |
         |                                 ------------------------------
    ***************************************
R   * If SMOKE warning does not come on   *
    ***************************************

    ***************************************
R   * Replace amplifier [5] and carry out*
R   * a SMOKE test                        *
R   * SMOKE and AIR warning lights come   *
R   * on                                  *
    ***************************************
         |             |
         |             |                   ------------------------------
R        |             --------------------| Amplifier [5] was faulty   |
         |                                 ------------------------------
         |
         |                                 ------------------------------
R        |---------------------------------| Replace smoke detector [10]|
                                           ------------------------------
```

R Chart 108 Sheet 1 of 1

```
*************************************
* SMOKE GR4 WARNING ILLUMINATED     *
* COND VALVE 4 SWITCH IN OFF        *
* COND VALVE MAGNETIC INDICATOR IN  *
* SHUT POSITION                     *
* SMOKE WARNING LIGHT REMAINS       *
* ILLUMINATED                       *
* SMOKE WARNING LIGHT ILLUMINATED ON *
* MASTER WARNING PANEL              *
*************************************

*************************************
* Place SMOKE 4 rotary test switch  *
* in OFF 4 position                 *
* SMOKE warning light remains       *
* illuminated                       *
*************************************
    ||                  |
    YES                 NO
    ||                  |
    ||         --------------------------
    ||         | In GRND PWR PNL 11-123 |
    ||         | check diode 4H703 [8]  |
    ||         --------------------------
    ||              |            |          ------------------------------
    ||           correct     Incorrect-| Replace diode 4H703 [8]     |
    ||              |                      ------------------------------
    ||              |                      ------------------------------
    ||              |-------------------| Replace switch 4H866 [11]   |
    ||                                     ------------------------------
*************************************
* Remove group 4 amplifier [5]      *
* SMOKE warning goes off            *
*************************************
    ||          |        ---------------------------------------------
    YES         |        | On GRND PWR PNL 11-123 [14], on test       |
    ||          NO-------| connector UT 1894, check voltage between   |
    ||                   | terminal C14 and aircraft ground           |
    ||                   ---------------------------------------------
    ||                        |        |
    ||                        |        |         ------------------------------
    ||                   0 Volt   28 Volts-| Replace relay 4H695 [2]     |
    ||                        |                  ------------------------------
    ||                        |                  ------------------------------
    ||                        |-------------| Replace relay 4H696 [3]     |
    ||                                           ------------------------------
    ||
    ||
```

Chart 109 (Sheet 1 of 2)

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```
     ||
     ||
***************************************
* Place group 4 amplifier [5] back    *
* in position                         *
* Disconnect connector 4H705 [10]     *
* from smoke detector                 *
* SMOKE warning light goes off.       *
***************************************
     ||                      |
     YES                     NO     -----------------------------------
     ||                      |-----| Replace group 4 amplifier [5]   |
     ||                             -----------------------------------
     ||
     ||
     ||
     ||                             -----------------------------------
     ||----------------------------| Replace group 4 detector [10]   |
                                    -----------------------------------
```

Chart 109 (Sheet 2 of 2)

```
    **************************************
R   * SMOKE ROTARY TEST SWITCH IN INHIB  *
R   * POSITION                           *
R   * COND VALVE SWITCH IN ON POSITION   *
R   * COND VALVE MAGNETIC INDICATOR      *
R   * DISPLAYS OPEN                      *
R   * SMOKE GR4 WARNING LIGHT REMAINS    *
R   * ILLUMINATED                        *
R   * SMOKE WARNING LIGHT ILLUMINATED    *
R   * ON MASTER WARNING PANEL            *
    **************************************

    **************************************
R   * On amplifier, remove the forward   *
R   * plate with TOP marking, FAULT      *
R   * warning light comes on ; turn the  *
R   * plate by 180°, FAULT warning light *
R   * goes off                           *
    **************************************
        |                       |             ------------------------------
R       NO                      |----YES-------| Replace smoke detector [10]|
        |                                     ------------------------------
        |
        |                                     ------------------------------
R       |-------------------------------------| Replace amplifier [5]      |
                                              ------------------------------
```

R Chart 110

```
*************************************-------------------------------
* SMOKE GR4 WARNING LIGHT ILLUMINATED*| GROUND EQUIPMENT REQUIRED   |
* SMOKE ROTARY TEST SWITCH IN INHIB  *-------------------------------
* POSITION                           *| DESCRIPTION        PART NO  |
* COND VALVE SWITCH IN OFF THEN IN   *-------------------------------
* ON POSITION                        *| 1 MULTIMETER                |
* COND VALVE MAGNETIC INDICATOR      *-------------------------------
* IN SHUT POSITION                   *
* SMOKE ROTARY TEST SWITCH IN        *
* OFF 4 POSITION                     *
* COND VALVE MAGNETIC INDICATOR IN   *
* OPEN POSITION                      *
*************************************
       ||
       ||
*************************************
* Replace relay 4H695 [2]            *
* Place COND VALVE switch [11] in    *
* OFF position                       *
* SMOKE rotary test switch [6] in    *
* INHIB position                     *
* COND VALVE switch in ON position   *
* On GRND PWR PNL 11-123 [14] on     *
* test connector UT 1894, measure    *
* voltage between terminal 13C       *
* and aircraft ground                *
*************************************
       ||             |              -------------------------------
       28V            0V------------| Replace SMOKE rotary test    |
       ||                           | switch [6]                   |
       ||                            -------------------------------
       ||
       ||                            -------------------------------
       ||---------------------------| Relay 4H695 [2] was faulty   |
       ||                            -------------------------------
       ||
       ||
*************************************
* For SMOKE warning                  *
*************************************
       ||
       ||                            -------------------------------
       ||---------------------------| Ref. 21-17-00, Chart 107     |
                                     -------------------------------
```

Chart 111

```
*************************************-------------------------------
* COND VALVE GR4 SWITCH IN ON OR     *| GROUND EQUIPMENT REQUIRED  |
* BOOST POSITION                     *-----------------------------
* SMOKE WARNING LIGHT ILLUMINATED    *| DESCRIPTION        PART NO |
* SMOKE WARNING LIGHT ON MASTER      *-----------------------------
* WARNING PANEL ILLUMINATED          *| MULTIMETER                 |
* COND VALVE MAGNETIC INDICATOR      *-----------------------------
* IN OPEN POSITION                   *
**************************************

**************************************
* Place COND VALVE GR4 switch [11]   *
* in ON position                     *
* Place rotary test switch [6] in    *
* SMOKE position                     *
* AIR warning light comes on         *
**************************************-------------------------------
        ||                 |        | Ref. Trouble Shooting         |
        ||                 |        | 21-11-00, chart 118           |
        ||                 |        | Sheet 1 of 1 air Cond-        |
        NO                YES-------| itioning valve does not       |
        ||                          | close                         |
        ||                          | For SMOKE detection,          |
        ||                          | Ref. 21-17-00, Chart 107      |
        ||                          | Sheet 1 of 1                  |
        ||                          ---------------------------------
**************************************
* On GRND PWR PNL 11-123 [14], test  *
* connector UT 1894, measure voltage *
* between terminal 14-C and          *
* aircraft ground.                   *
**************************************
        ||                 |        ---------------------------------
        0V                28V-------| Replace group 4 relay [3]     |
        ||                          ---------------------------------
        ||
        ||                          ---------------------------------
        ||--------------------------| Replace group 4 relay [2]     |
                                    ---------------------------------
```

Chart 112

	ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
R	[1] Relay	123 AB	11-123	1H694		21-10-00 R/I	21-17-11
R	Relay	123 AB	11-123	2H694		21-10-00 R/I	21-17-21
R	Relay	123 AB	11-123	3H694		21-10-00 R/I	21-17-31
R	Relay	123 AB	11-123	4H694		21-10-00 R/I	21-17-41
R	[2] Relay	123 AB	11-123	1H695		21-10-00 R/I	21-17-11
R	Relay	123 AB	11-123	2H695		21-10-00 R/I	21-17-21
R	Relay	123 AB	11-123	3H695		21-10-00 R/I	21-17-31
R	Relay	123 AB	11-123	4H695		21-10-00 R/I	21-17-41
R	[3] Relay	123 AB	11-123	1H696		21-10-00 R/I	21-17-11
R	Relay	123 AB	11-123	2H696		21-10-00 R/I	21-17-21
(R)	Relay	123 AB	11-123	3H696		21-10-00 R/I	21-17-31
R	Relay	123 AB	11-123	4H696		21-10-00 R/I	21-17-41
R	[4] Relay	123 AB	11-123	1H697		21-10-00 R/I	21-17-11
R	Relay	123 AB	11-123	2H697		21-10-00 R/I	21-17-21
R	Relay	123 AB	11-123	3H697		21-10-00 R/I	21-17-31
R	Relay	123 AB	11-123	4H697		21-10-00 R/I	21-17-41
	[5] Amplifier - Smoke detector		2-215	1H698		21-17-21 R/I	21-17-11
	Amplifier - Smoke detector		2-215	2H698		21-17-21 R/I	21-17-21
	Amplifier - Smoke detector		10-216	3H698		21-17-21 R/I	21-17-31
	Amplifier - Smoke detector		2-216	4H698		21-17-21 R/I	21-17-41

	ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
R	[6] Switch - Rotary test		28-214	H699		21-17-22 R/I	21-17-11
R R	[7] Diode	123 AB	11-123	1H702		21-10-00 R/I	21-17-11
R R	Diode	123 AB	11-123	2H702		21-10-00 R/I	21-17-21
R R	Diode	123 AB	11-123	3H702		21-10-00 R/I	21-17-31
R R	Diode	123 AB	11-123	4H702		21-10-00 R/I	21-17-41
R	[8] Diode	123 AB	11-123	1H703		21-10-00 R/I	21-17-11
R R	Diode	123 AB	11-123	2H703		21-10-00 R/I	21-17-21
R R	Diode	123 AB	11-123	3H703		21-10-00 R/I	21-17-31
R R	Diode	123 AB	11-123	4H703		21-10-00 R/I	21-17-41
R R	[9] Diode	123 AB	11-123	1H704		21-10-00 R/I	21-17-11
R R	Diode	123 AB	11-123	2H704		21-10-00 R/I	21-17-21
R R	Diode	123 AB	11-123	3H704		21-10-00 R/I	21-17-31
R R	Diode	123 AB	11-123	4H704		21-10-00 R/I	21-17-41
	[10] Detector-Smoke	151 CB	151	1H705		21-17-11 R/I	21-17-11
	Detector-smoke	151 CB	151	2H705		21-17-11 R/I	21-17-21
	Detector-smoke	151 CB	152	3H705		21-17-11 R/I	21-17-31
	Detector-smoke	151CB	152	4H705		21-17-11 R/I	21-17-41

	ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
	[11] Switch COND VALVE		2-214	1H866		21-10-00 R/I	21-17-11
	Switch COND VALVE		2-214	2H866		21-10-00 R/I	21-17-21
	Switch COND VALVE		2-214	3H866		21-10-00 R/I	21-17-31
	Switch COND VALVE		2-214	4H866		21-10-00 R/I	21-17-41
R	[12] CAU	534 AT		1H883		21-12-35 R/I	21-12-05
R	CAU	533 BT		2H883		21-12-35 R/I	21-12-06
R	CAU	633 BT		3H883		21-12-35 R/I	21-12-07
R	CAU	634 AT		4H883		21-12-35 R/I	21-12-08
	[13] GRP1 AIR COND VALVE close and AIR GEN IND		1-213	1H612	D11	24-50-00 R/I	21-17-01
R R	GRP2 AIR COND VALVE close and AIR GEN IND		5-213	2H612	A 9	24-50-00 R/I	21-17-02
R R	GRP3 AIR COND VALVE close and AIR GEN IND		15-215	3H612	A 3	24-50-00 R/I	21-17-03
R	GRP4 AIR COND VALVE close and AIR GEN IND		15-216	4H612	A24		21-17-04
	[14] GRND PWR PNL	123 AB	123	11-123			

Component Identification
Table 101 2 of 2

SMOKE DETECTION - ADJUSTMENT/TEST

1. General

The four smoke detection systems, corresponding to the four air conditioning groups are identical, thus the test procedure described for group 1 will be valid for groups 2, 3, 4. Electrical identifiers and equipment location of corresponding equipment will be specified each time between brackets.
Ex : group 1 (2, 3, 4)

2. Operational Tests

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	

B. Prepare

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, R Servicing).

(2) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP 1 AIR COND VALVE CLOSE & AIR GEN IND	1-213	1H 612	D11
MWS SUP 1		W 252	N21
AUDIO WARN SYS SUB 1		W 371	N21
GRP 1 FUEL VALVE CONT	2-213	1H 863	D16
GRP 3 FUEL VALVE CONT		3H 863	F16
GRP 1 TEMP SELECTOR AUTO SUP & CONT		H1000	B17
GRP 3 TEMP SELECTOR AUTO SUP & CONT		H1002	G16
GRP 2 FUEL VALVE CONT	4-213	2H 863	E12
GRP 4 FUEL VALVE CONT		4H 863	B11
GRP 2 TEMP SELECTOR AUTO SUP & CONT		H1001	E11
GRP 4 TEMP SELECTOR AUTO		H1003	B12

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SUP & CONT			
GRP 2 AIR COND VALVE CLOSE & AIR GEN IND	5-213	2H 612	A 9
MWS SUB 2		W 251	D15
AUDIO WARN SYS SUB 2		W 372	C17
GRP 3 AIR COND VALVE CLOSE & AIR GEN IND	15-215	3H 612	A 3
3CM STN RH LT TEST SUP		L1006	D14
GRP 4 AIR COND VALVE CLOSE & AIR GEN IND	15-216	4H 612	A24

(3) On panel 2-214
- place the 4 COND VALVE switches 1 (2, 3, 4) H866 in ON position.

(4) On panel 28-214
- place AIR GENERATION selector switch H699 in NORM position.

(5) On panel 28-214, all AIR GENERATION-FAULT and SMOKE warning lights must be extinguished.

(6) Pressurize Fuel System

WARNING : OBSERVE FUEL SYSTEM SAFETY PRECAUTIONS DESCRIBED IN 28-00-00 AND 28-10-00.

NOTE : Pressurization assumes a minimum quantity of fuel of 2500 kg in the appropriate feed tank (1, 2, 3, 4).
On centre console, place throttle control levers in SHUT position (lower mechanical stop).
Check that crossfeed valves are closed and that associated magnetic indicators display vertical stripes.
With the LP VALVE switch locked at OPEN by the switch guard, check that the associated magnetic indicator shows an in-line indication.
Place the first of the three ENGINE FEED PUMPS control switches in ON position (MAIN PUMP)
Engine 1 Main Fuel Pump for group 1
Engine 2 Main Fuel Pump for group 2

Engine 3 Main Fuel Pump for group 3
Engine 4 Main Fuel Pump for group 4
Check that corresponding LOW PRESS indicator light goes off when pump operating pressure is reached.

WARNING : FUEL SYSTEM MUST NOT OPERATE MORE THAN 2 HOURS.

In case Fuel System cannot be used.

Trip, safety and tag the following circuit breakers

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
For GRP 1 LH.UC WEIGHT SW A SYS SUP	1-213	G 292	M17
For GRP 2 LH.UC WEIGHT SW B SYS SUP	3-213	G 293	B 8
For GRP 3 RH.UC WEIGHT SW B SYS SUP	3-213	G 294	B 9
For GRP 4 RH.UC WEIGHT SW A SYS SUP	1-213	G 295	M18

WARNING : DURING TEST, FUEL EXCH WARNING LIGHT MAY ILLUMINATE. ON PANEL 2-214 PLACE FUEL VALVE SWITCH IN OPEN POSITION (SELF-HOLDING CANCELLATION).

C. Test Common to the Four Groups (Ref. Fig. 501)

(1) On panel 28-214
- place AIR GENERATION selector switch H699 in the different positions shown on table below and check the resulting operations.

SELECTOR SWITCH POSITION	RESULTING OPERATION
INHIB	NONE
FAULT	ON PANEL 28.214 THE 4 AIR GENERATION-FAULT INDICATOR LIGHTS H701 COME ON
INHIB	THE FOUR AIR GENERATION-FAULT INDICATOR LIGHTS H701 GO OFF
NORM TO MW GR4	NONE
TEST	ON PANEL 28.214 THE FOUR AIR GENERATION SMOKE INDICATOR LIGHTS H700 COME ON THE AIR INDICATOR LIGHT COMES ON ON MASTER WARNING PANEL W254 + GONG
MW-GR4	SMOKE INDICATOR LIGHT COMES ON ON MASTER WARNING PANEL W254 + GONG
OFF-GR4	4 - ON PANEL 28.214 AIR GENERATION-SMOKE INDICATOR LIGHT H700 GOES OFF SMOKE INDICATOR LIGHT GOES OFF ON MASTER WARNING PANEL W254
MW-G3	SMOKE INDICATOR LIGHT COMES ON ON MASTER WARNING PANEL W254 + GONG
OFF-G3	3 - ON PANEL 28.214 AIR GENERATION-SMOKE INDICATOR LIGHT H700 GOES OFF SMOKE INDICATOR LIGHT GOES OFF ON MASTER WARNING PANEL W254
MW-GR2	SMOKE INDICATOR LIGHT COMES ON ON MASTER WARNING PANEL W254 + GONG
OFF-G2	2 - AIR GENERATION-SMOKE INDICATOR LIGHT H700 GOES OFF ON PANEL 28.214 SMOKE INDICATOR LIGHT GOES OFF ON MASTER WARNING PANEL W254
MW-GR1	SMOKE INDICATOR LIGHT COMES ON ON MASTER WARNING PANEL W254 + GONG
OFF-GR1	1 - AIR GENERATION-SMOKE INDICATOR LIGHT H700 GOES OFF ON MASTER WARNING PANEL W254 + GONG THE TWO AIR AND SMOKE INDICATOR LIGHTS GO OFF ON NASTER WARNING PANEL W254
NORM	ALL FAULT AND SMOKE INDICATOR LIGHTS ARE EXTINGUISHED

TABLE OF TESTS

CMA 21 17 00 5 AAMO

Table of Tests
Figure 501

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(2) In zone 215, on smoke detector amplifier 1H698, remove both securing screws from test module marked TOP.
R Remove test module, FAULT warning light comes on on panel 28-214.
Turn test module upside down (TOP reversed).
FAULT warning light goes off.
Remove test module, FAULT warning light comes on.
Place COND VALVE switch from ON to OFF position.
R Place test module back in its location with TOP marking
R at the upper part.
R FAULT warning light goes off.
R Install both securing screws.
R Place COND VALVE switch from ON to OFF position.

D. Close-Up

(1) In case the Fuel System has been pressurized

Place ENGINE FEED PUMP switch in OFF position.
After a few seconds the corresponding LOW PRESS indicator light must illuminate.

If necessary, remove safety clip and tag and reset circuit breaker tripped in paragraph 2.B.(6).
If FUEL EXCH warning has come on during test after switching off the ground air supply unit, wait for cancellation of warning and place FUEL VALVE switch in AUTO position.

(2) De-energize the aircraft electrical network and disconnect electrical ground power unit.

SMOKE DETECTOR - REMOVAL/INSTALLATION

WARNING : RADIOACTIVITY
R THE SMOKE DETECTORS CONTAIN RADIO-ACTIVE AMERICIUM 241
R OF APPROXIMATELY 0.8 MICROCURIES.

R IT IS ABSOLUTELY PROHIBITED TO OPEN OR REPAIR THE SMOKE
R DETECTORS EXCEPT IN THE MANUFACTURER'S SPECIALLY DESIGNED
R WORKSHOPS.

1. General

The removal/installation procedure is identical for the smoke detector of each group.

2. Smoke Detector

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 2.96 m (9 ft. 8 in.)	
Circuit Breaker Safety Clips	

B. Prepare

(1) Trip, safety and tag the following circuit breakers :

For removal of group 1 smoke detector :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 AIR COND VALVE CLOSE & AIR GEN IND	1-213	1H 612	D11
GRP1 TEMP SELECTOR AUTO SUP & CONT	2-213	H1000	B17

For removal of group 2 smoke detector :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP2 AIR COND VALVE CLOSE & AIR GEN IND	4-213	H1001	E11
GRP2 TEMP SELECTOR AUTO SUP & CONT	5-213	2H 612	A 9

For removal of group 3 smoke detector :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP3 AIR COND VALVE CLOSE & AIR GEN IND	2-213	H1002	G16
GRP3 TEMP SELECTOR AUTO SUP & CONT	15-215	3H 612	A 3

For removal of group 4 smoke detector :

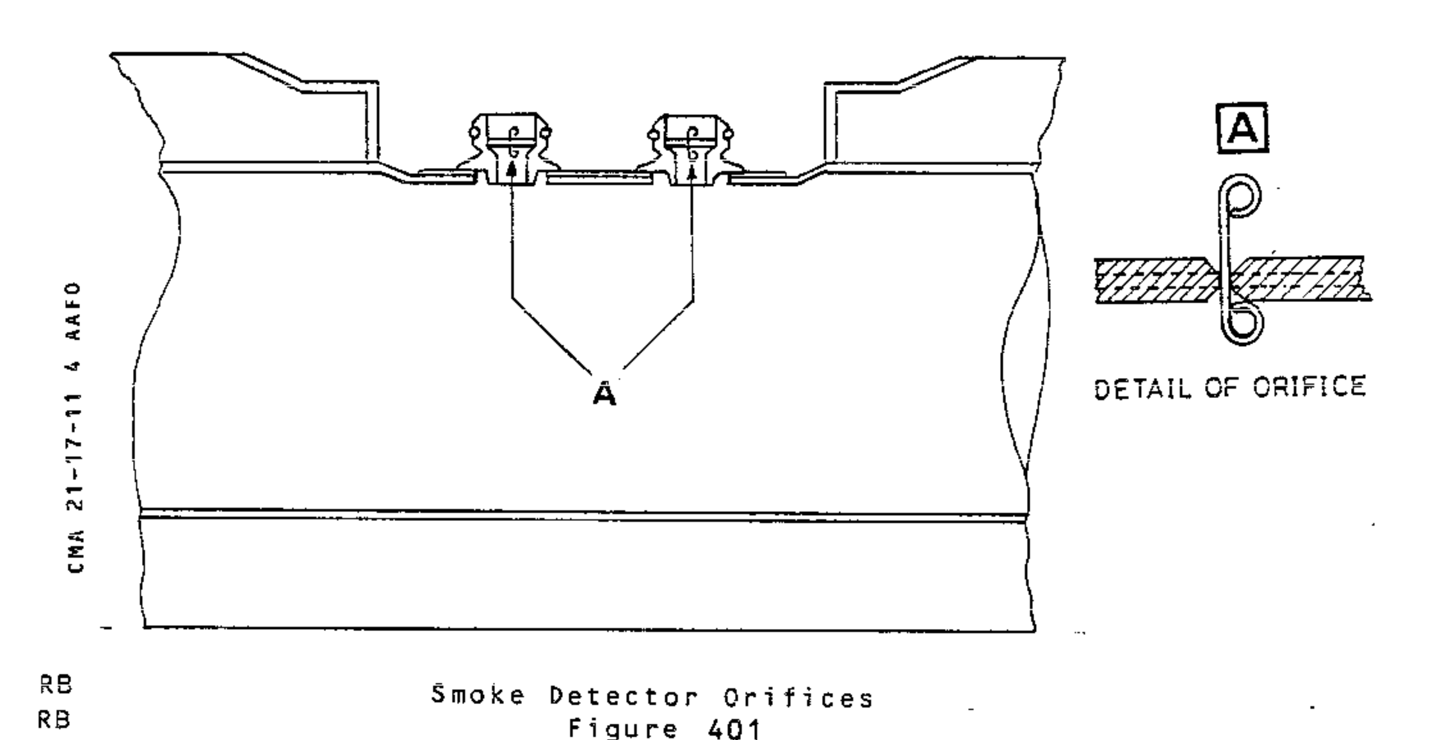
SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP4 AIR COND VALVE CLOSE & AIR GEN IND	4-213	H1003	B12
GRP4 TEMP SELECTOR AUTO SUP & CONT	15-216	4H 612	A24

(2) Open access door 151CB.

RB C. Check Orifices (Ref. Fig. 401)

RB (1) Orifices are installed in the duct connections to the
RB smoke detector.

RB NOTE : The orifice Part No. E.840521, diameter 0.6 mm
RB (0.0236 ins). A length of 26 swg lock wire is
RB fitted loosely through the orifice to keep it
RB Free of Contamination. The orifice is retained
RB in the mounting by araldite.



RB
RB Smoke Detector Orifices
Figure 401

RB D. Remove (Ref. Fig. 402)

(1) Detach strap (9) maintaining heat insulating housing.

(2) Remove heat insulating housing (1).

(3) Disconnect electrical connector (11).

(4) Open clamp (2) securing smoke detector.

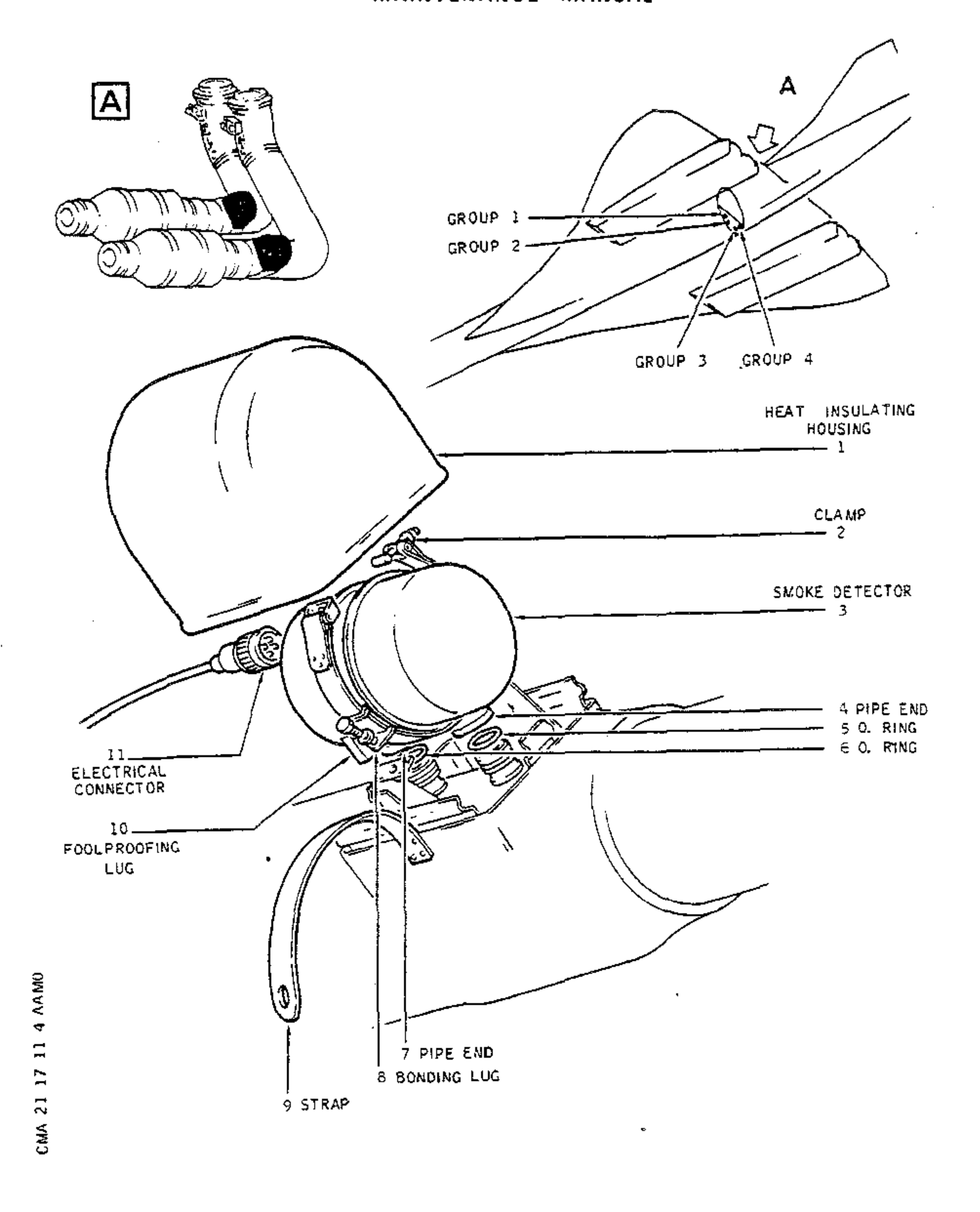
(5) Remove smoke detector (3) ; lift it up perpendicularly to the pipe in order to disengage it from sensing and reference pipe.

RB E. Install

(1) Replace O-rings (5) and (6) from pipes (4) and (7) ends.

(2) Install smoke detector (3) on pipes (4) and (7) ends. Lug (10) permits correct positioning of smoke detector.

CAUTION : CHECK THAT CONTACT IS CORRECT BETWEEN BONDING LUG AND SMOKE DETECTOR BODY.



RB

Smoke Detector Installation
Figure 402

(3) Tighten clamp (2).

(4) Install electrical connector (11).

(5) Install insulating housing (1) ; secure with strap (9).

B (6) Test

B (a) Remove safety clips and tags and reset circuit
B breakers tripped in para 2B(1).

B (b) Test smoke detection systems in accordance with
B 21-17-00 ADJSUTMENT/TEST - omit paragraph 2C(2)

R B F. Close-Up

B (1) Close access door 151CB

B (2) Remove access platform

SMOKE DETECTION CONTROL AND INDICATING - REMOVAL/INSTALLATION

WARNING : OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN
R 24-00-00.

1. General

Removal/Installation of warning indicator module on panel 28-214.

2. Warning Indicator Module

CAUTION : ELECTRO LUMINESCENT PANELS ARE VULNERABLE TO DAMAGE BY SCRATCHING AND CRACKING. ENSURE THAT SOCKET SPANNERS DO NOT DAMAGE THE POLISHED WALL OF THE PANEL CUT-OUTS.

A. Prepare

(1) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG1-4 FIRE EXT SHOT SUP	1-213	W 61	N19
ENG2-3 FIRE EXT SHOT SUP		W 62	N20
ENG1-4 FIRE EXT SHOT 2 SUP	5-213	W 63	A15
ENG2-3 FIRE EXT SHOT 2 SUP		W 64	A16
SMOKE DETECT CABIN SYS SUP		W 331	D16
3CM STN RH INST LTS SUP	14-215	L 376	F11
3CM STN RH LT TEST SUP	15-215	L1006	D14
ENG2-3 FIRE EXT TEST SUPPLY		W 66	A 1
ENG1-4 FIRE EXT TEST SUP	15-216	W 65	A27

(2) Remove quick release fasteners, withdraw the panel forwards ; disconnect electrical connectors.

(3) On removed panel, remove dust cover attachment screws.

B. Remove (Ref. Fig. 401)

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(1) If necessary, release the cable ties to facilitate access to terminals ; identify electrical cables.

(2) Using a suitable insertion extraction tool, remove pins from connectors.

R (3) On front face of panel, unscrew both module attachment screws, pull the latter forward.

C. Install

(1) Observe the electrical safety precautions.

(2) Engage the module from the forward part of panel ; screw and tighten both attaching screws.

(3) Using a suitable tool, connect the electrical cables to the connector making certain that the connections are made in accordance with identification labels and corresponding wiring diagrams.

(4) If necessary, secure electrical cables with ties.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(5) Install dust cover on the rear of panel. Tighten attaching screws.

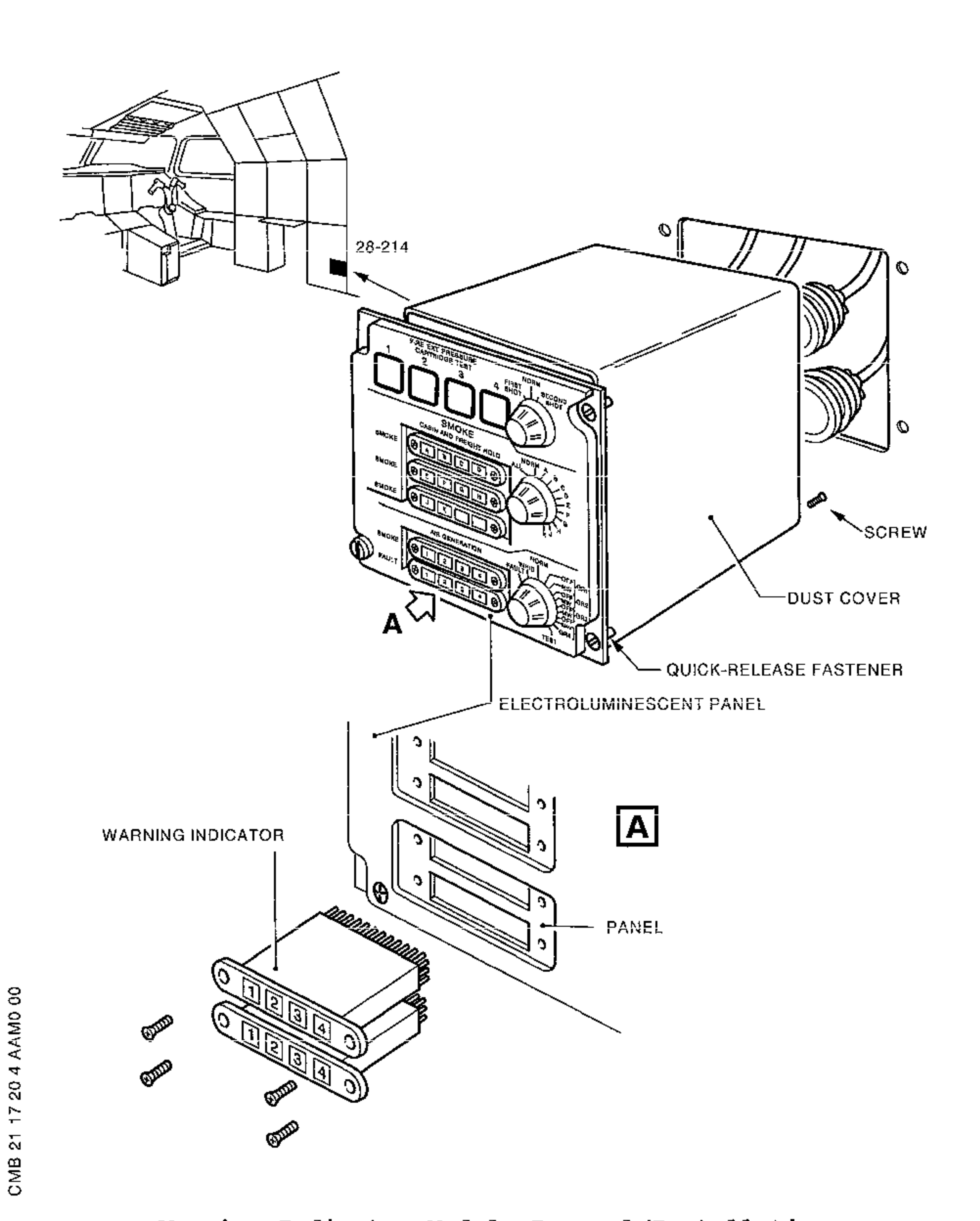
(6) Connect electrical connector to the unit in accordance with connector identifications.

(7) Insert the panel into the structure. Attach with the quick release fasteners.

CAUTION : WHEN INSERTING THE PANEL, MAKE CERTAIN THAT CABLES ARE NOT TRAPPED OR DISTORTED.

D. Test

R (1) Cancel the electrical safety precautions and check the operation of rotary switch by carrying out the test procedure described in 21-17-00, Adjustment/Test.



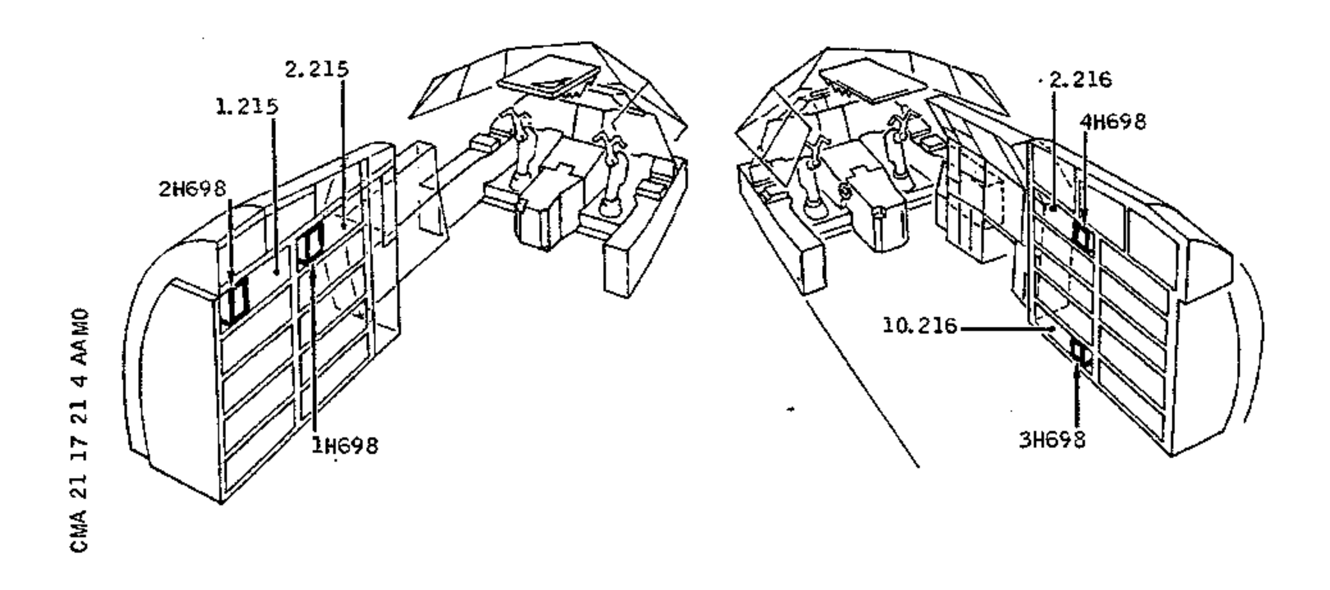
Warning Indicator Module Removal/Installation
Figure 401

SMOKE DETECTOR AMPLIFIER - REMOVAL/INSTALLATION

1. General

A. The removal/installation procedure is identical for the four smoke detector amplifiers; only their location is different

2. Smoke Detector Amplifier (Ref. Fig. 401)



Location of Smoke Detector Amplifiers
Figure 401

A. Equipment and Material

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	

B. Prepare

(1) On electronics racks, open the relevant panel :

Panel 2-215 for group 1 smoke detector amplifier
Panel 1-215 for group 2 smoke detector amplifier
Panel 10-216 for group 3 smoke detector amplifier
Panel 2-216 for group 4 smoke detector amplifier

(2) Trip safety and tag the following circuit breakers

(a) for group 1 smoke detector amplifier

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 AIR COND VALVE CLOSE & AIR GEN IND	1-213	1H 612	D11
GRP1 TEMP SELECTOR AUTO SUP & CONT	2-213	H1000	B17

(b) for group 2 smoke detector amplifier

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP2 AIR COND VALVE CLOSE & AIR GEN IND	5-213	2H 612	A 9
GRP2 TEMP SELECTOR AUTO SUP & CONT	4-213	H1001	E11

(c) for group 3 smoke detector amplifier

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP3 AIR COND VALVE CLOSE & AIR GEN IND	15-215	3H 612	A 3
GRP3 TEMP SELECTOR AUTO SUP & CONT	2-213	H1002	G16

(d) for group 4 smoke detector amplifier

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP4 AIR COND VALVE CLOSE & AIR GEN IND	15-216	4H 612	A24
GRP4 TEMP SELECTOR AUTO SUP & CONT	4-213	H1003	B12

C. Remove

(1) Unscrew attaching nut until it is out of the tab

(2) Move screw and nut downwards

(3) Pull smoke detector amplifier hold it in order that it does not fall when it is out of the electronics rack

D. Preparation of Replacement Component

(1) Make certain that electrical connector is in good condition (rack side and smoke detector amplifier side)

(2) Check that smoke detector amplifier is free from impact blows on traces of corrosion

E. Install

(1) Install smoke detector amplifier in its location

(2) Lift the screw and nut assembly and screw the latter in tab on the front face of amplifier

(3) Tighten nut fully

F. Test

(1) Remove safety clips and tags and reset the following circuit breakers

(a) for group 1 smoke detector amplifier

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 AIR COND VALVE CLOSE & AIR GEN IND	1-213	1H 612	D11
GRP1 TEMP SELECTOR AUTO SUP & CONT	2-213	H1000	B17

(b) for group 2 smoke detector amplifier

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP2 AIR COND VALVE CLOSE & AIR GEN IND	5-213	2H 612	A 9
GRP2 TEMP SELECTOR AUTO SUP & CONT	4-213	H1001	E11

(c) for group 3 smoke detector amplifier

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP3 AIR COND VALVE CLOSE & AIR GEN IND	15-215	3H 612	A 3
GRP3 TEMP SELECTOR AUTO SUP & CONT	2-213	H1002	G16

(d) for group 4 smoke detector amplifier

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP4 AIR COND VALVE CLOSE & AIR GEN IND	15-216	4H 612	A24
GRP4 TEMP SELECTOR AUTO SUP & CONT	4-213	H1003	B12

(2) Test smoke detector amplifier (Ref. 21-17-00, Page 501, A/T)

G. Close Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment

(2) On electronics racks close the relevant panel :

Panel 2-215 for group 1 smoke detector amplifier
Panel 1-215 for group 2 smoke detector amplifier
Panel 10-216 for group 3 smoke detector amplifier
Panel 2-216 for group 4 smoke detector amplifier

ROTARY SWITCH - REMOVAL/INSTALLATION

WARNING : OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN CHAPTER 24-00-00.

1. General

Removal/Installation of rotary switch H699 on panel 28-214.

2. Rotary Switch

CAUTION : ELECTRO LUMINESCENT PANELS ARE VULNERABLE TO DAMAGE BY SCRATCHING AND CRACKING. ENSURE THAT TUBULAR SPANNERS DO NOT DAMAGE THE POLISHED WALL OF THE PANEL CUT-OUTS.

A. Prepare

(1) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG1-4 FIRE EXT SHOT SUP	1-213	W 61	N19
ENG2-3 FIRE EXT SHOT SUP		W 62	N20
ENG1-4 FIRE EXT SHOT 2 SUP	5-213	W 63	A15
ENG2-3 FIRE EXT SHOT 2 SUP		W 64	A16
SMOKE DETECT CABIN SYS SUP		W 331	D16
3CM STN RH/INST LTS SUP	14-215	L 376	F11
3CM STN RH LT TEST SUP	15-215	L1006	D14
ENG2-3 FIRE EXT TEST SUPPLY		W 66	A 1
ENG1-4 FIRE EXT TEST SUP	15-216	W 65	A27

(2) Release the quick release fasteners, withdraw the panel ; disconnect electrical connectors.

(3) On removed panel, remove dust cover attachment screws ; remove dust cover.

B. Remove (Ref. Fig. 401)

(1) If necessary, release the cable loom ties to facilitate access to terminals ; identify electrical cables.

(2) Using a suitable tool remove pins from connectors.

(3) Remove cap from knurled knob.

(4) Remove clutchnut from knob ; pull knob forwards.

(5) Unlock and unscrew attaching nut.

(6) Remove the locking washer and withdraw the switch from the rear of the panel.

C. Install

(1) Observe the electrical safety precautions.

(2) Install rotary switch from the rear of the panel.

(3) Install locking washer ; screw attaching nut.

(4) Fit the knob on switch spindle, making certain that the spindle drive spigot is engaged with the slot in the knob ; tighten the clutchnut.

(5) Install cap on knob.

(6) Using a suitable tool, connect the electrical cables to the connector ensuring that the connections are made in accordance with identification labels and corresponding wiring diagrams.

(7) If necessary secure electrical cables with ties.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(8) Install dust cover on unit. Tighten attaching screws.

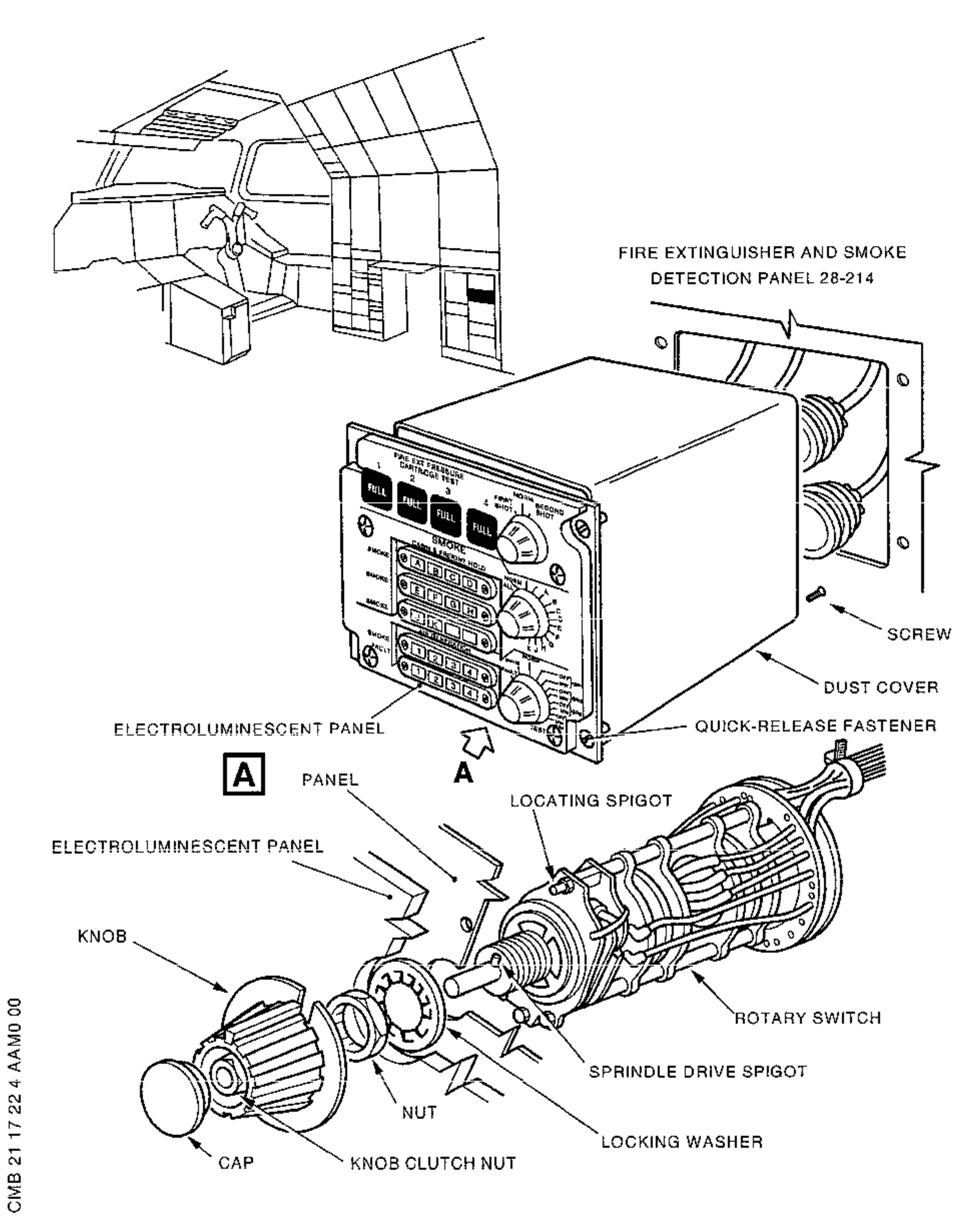
(9) Connect electrical connector to the unit in accordance with connector identifications.

(10) Insert the panel into the structure. Attach with the quick release fasteners.

CAUTION : WHEN INSERTING THE PANEL, MAKE CERTAIN THAT CABLES ARE NOT TRAPPED OR DISTORTED.

B D. Test

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Rotary Switch - Removal/Installation
Figure 401

B (1) Cancel the electrical safety precautions and check
B the operation of rotary switch by carrying out the
B test procedure (Ref. 21-17-00, ADJUSTMENT/TEST).

END OF THIS SECTION

NEXT

AIR EXTRACTION - DESCRIPTION AND OPERATION

1. General

The air extraction system supplies cooling air to equipment racks in the flight compartment, rear fuselage and beneath the floor. The system is controlled from panel 2-214 at the 3CM station and must be operating when the electrical systems are energized.

Air is drawn directly into the forward racks from the flight compartment, and into the rear racks via filters from the rear vestibule. Air is also directed to the forward racks and the underfloor racks by two fans each with a coupled non-return valve, that extract air from the passenger compartment roof. Upstream of each fan is a disposable filter. Crossover ducts upstream and downstream of the fans allow the system to operate on one fan only.

The air supply to the underfloor racks normally exceeds that extracted to ensure a small positive pressure which prevents inward leakage from the underfloor space to the racks. As an additional safeguard, the underfloor racks are also connected to the cabin directly by ducts in the forward vestibule side walls. Cool, uncontaminated air can thus be drawn into the racks if the normal supply fails. Each duct has a non-return valve, the free movement of which may be checked from the cabin.

The equipment rack shelves serve as collecting ducts for the air after cooling the equipment. Air is then extracted by cabin differential pressure when the aircraft is in flight, and by fans when the aircraft is on the ground. These fans, with associated non-return valves, are installed beneath the forward passenger compartment floor in zone 125/6 to extract air from the flight compartment, equipment racks and panels,
R underfloor racks, toilets and the forward galley. The toilets
R are connected by a separate duct to a position just forward of
R the extraction fans.

From the fans, the air is ducted to a plenum chamber, and is then normally discharged overboard through the forward cabin discharge valves contained in the chamber.

Three fans, coupled to non-return valves, are installed under the rear baggage compartment floor to extract air from the rear equipment racks and discharge it into the underfloor
R space in the region of the rear cabin discharge valves. The
R rear fan system is also used to extract galley odours and
R oven heat through ducts leading from the top of No.7 galley
R down the sidewall to the rear fan intake. The left hand out-

board fan is a standby fan.

Two pressure switches, in the forward extraction system and one in the rear extraction system, operate caption lights to indicate loss of airflow.

Ducting for each system is routed mainly below floor level. It is installed in manageable sections which are joined together by flexible sleeves and clamped to the structure at regular intervals. The extraction ducts from the passenger compartment to the flight compartment rack and to the underfloor racking are insulated to reduce heat transference from the underfloor area.

Control switches, caption lights and magnetic indicators for the fans, pressure switches and valves are on the equipment bay cooling section of panel 2-214 at the 3CM station.

2. Ducting (Ref. Fig. 003)

Ducts and manifolds of the air extraction systems are made of resin bonded glass tape or glass cloth laminations, in lengths convenient for installation and handling. Beads are formed on the ends of ducts by wrapping the outer lamination of glass tape over a fibre glass string. The manifold upstream of the fans and the ducts between the manifold and the discharge valves are made of light alloy.

Ducts are joined together by flexible sleeves secured by worm-drive clips. Components and ducts are joined together by sleeves, or clamping collars that secure the flanges of the component to those of the duct.

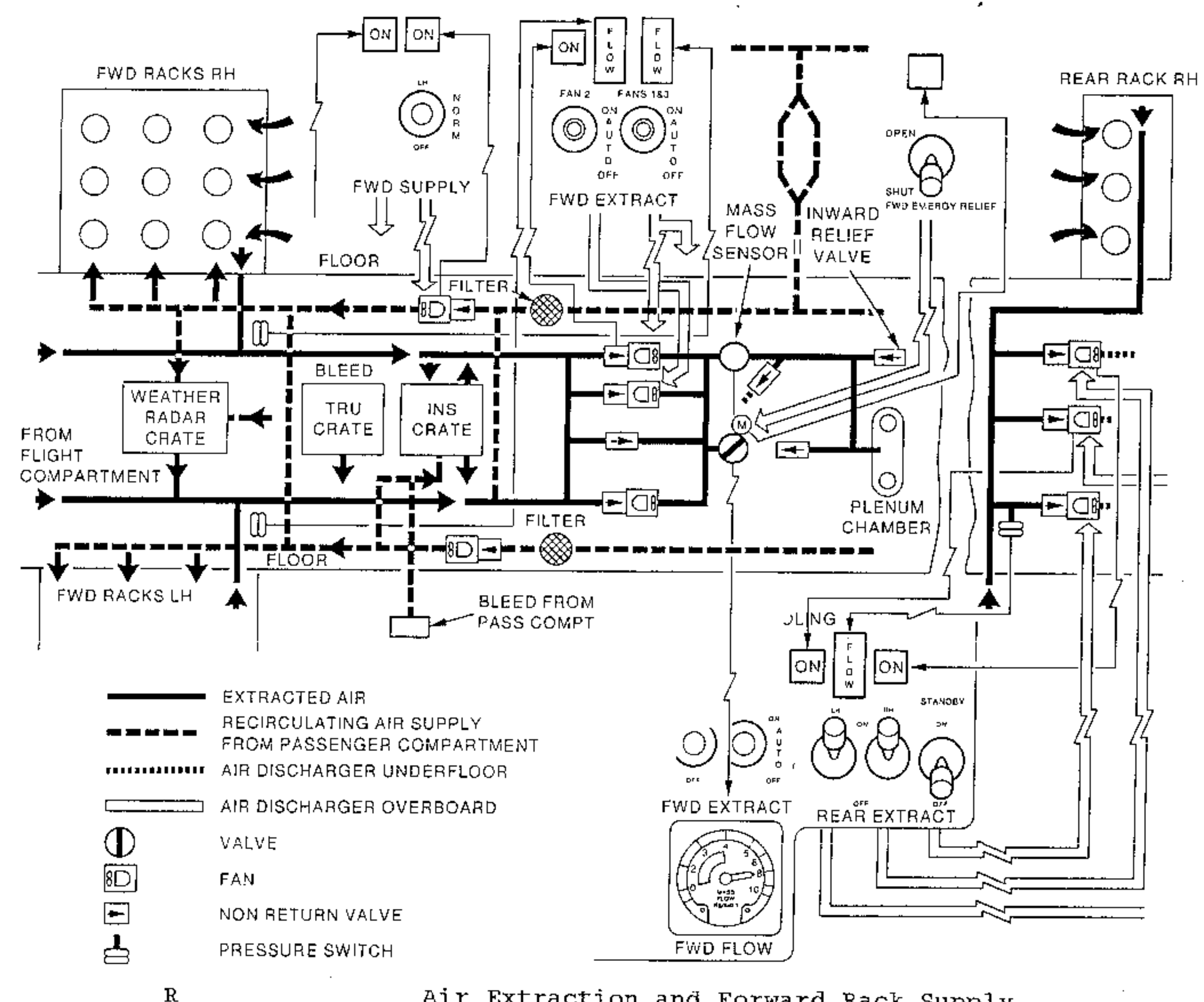
Light alloy restrictors are fitted to the ends of some ducts to achieve the correct airflow throughout the system. Gaps at the joints of light alloy ducts permit thermal expansion.

The ducts from the passenger compartment to the forward and underfloor rack and instrument crates are insulated with glass fibre covered by rubberized fabric secured with adhesive. This insulation prevents heat transference from the underfloor bays to the cooling air in the ducts.

Duct joints are wrapped with layers of glass-fibre which in turn is covered by the insulation cover. The cover is secured by worm-drive clips and the position of the centre-line of each clip is shown by the word CLIP. On each side of the clip and one inch (25.4 mm) from its centre-line one turn of thread is tied around the cover.

Ducts, insulation and insulating covers are repairable

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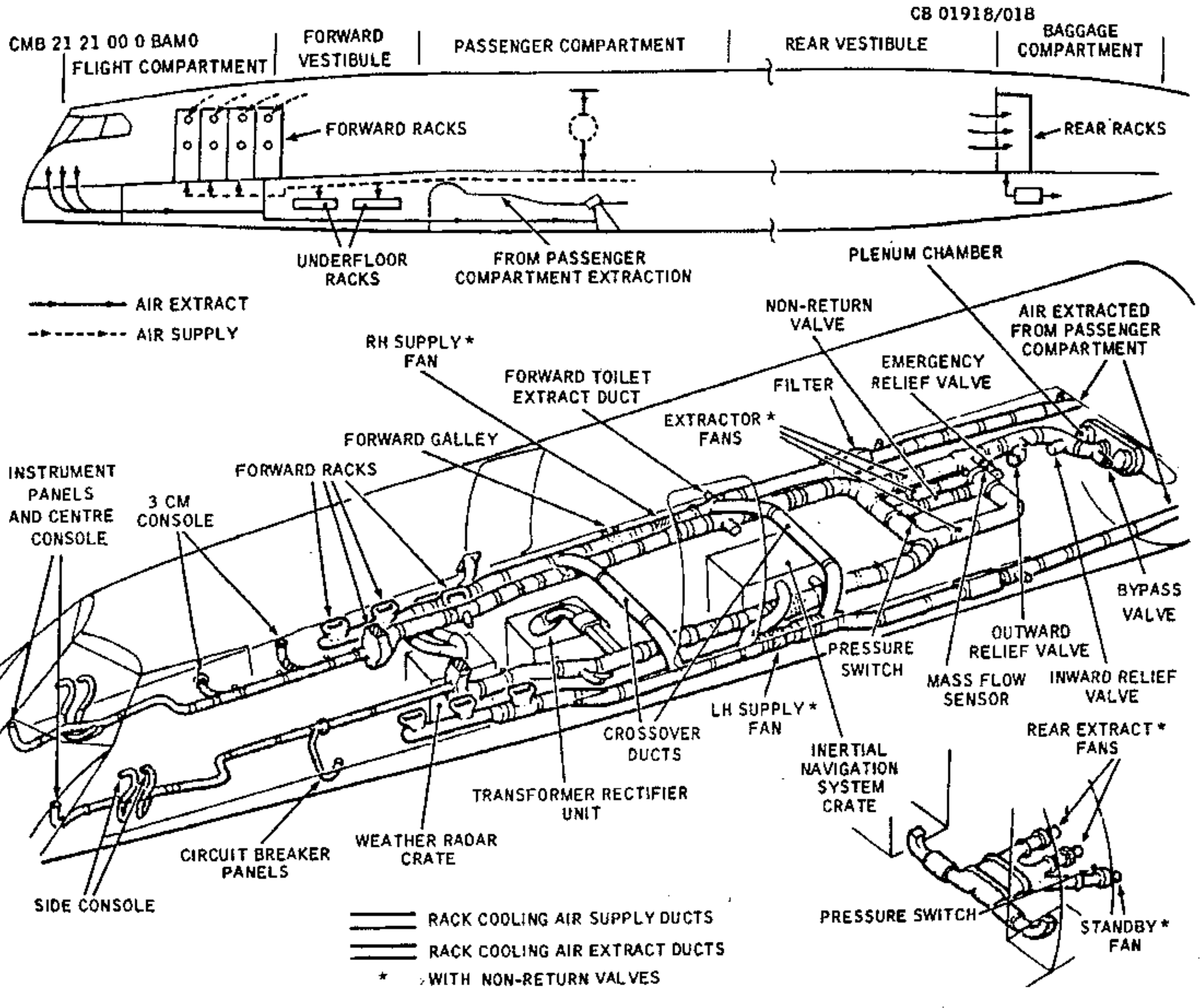


R

Air Extraction and Forward Rack Supply - Schematic
Figure 001

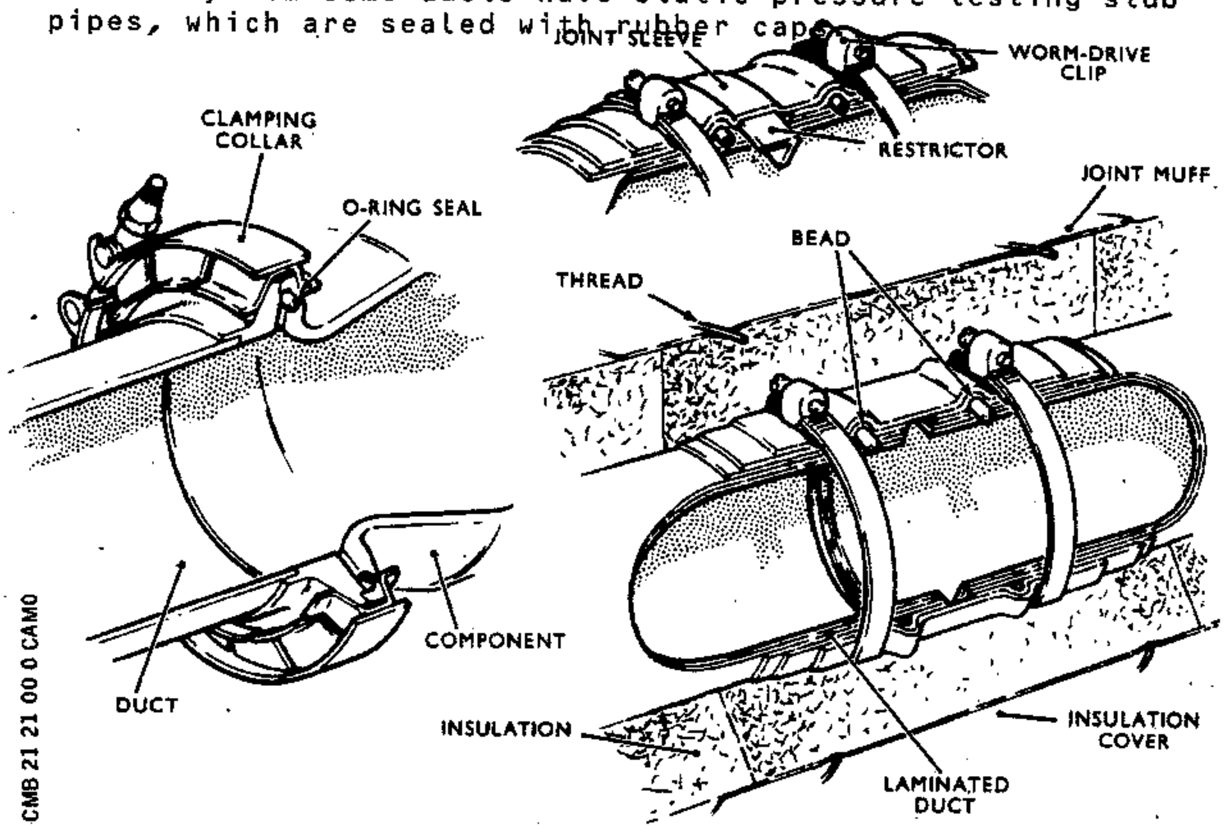
EFFECTIVITY: ALL

BA



Air Extraction
Figure 002

in situ. Sections of ducting are secured to the structure at frequent intervals by cradles and clamps. In each part of the system some ducts have static-pressure testing stub pipes, which are sealed with rubber caps.



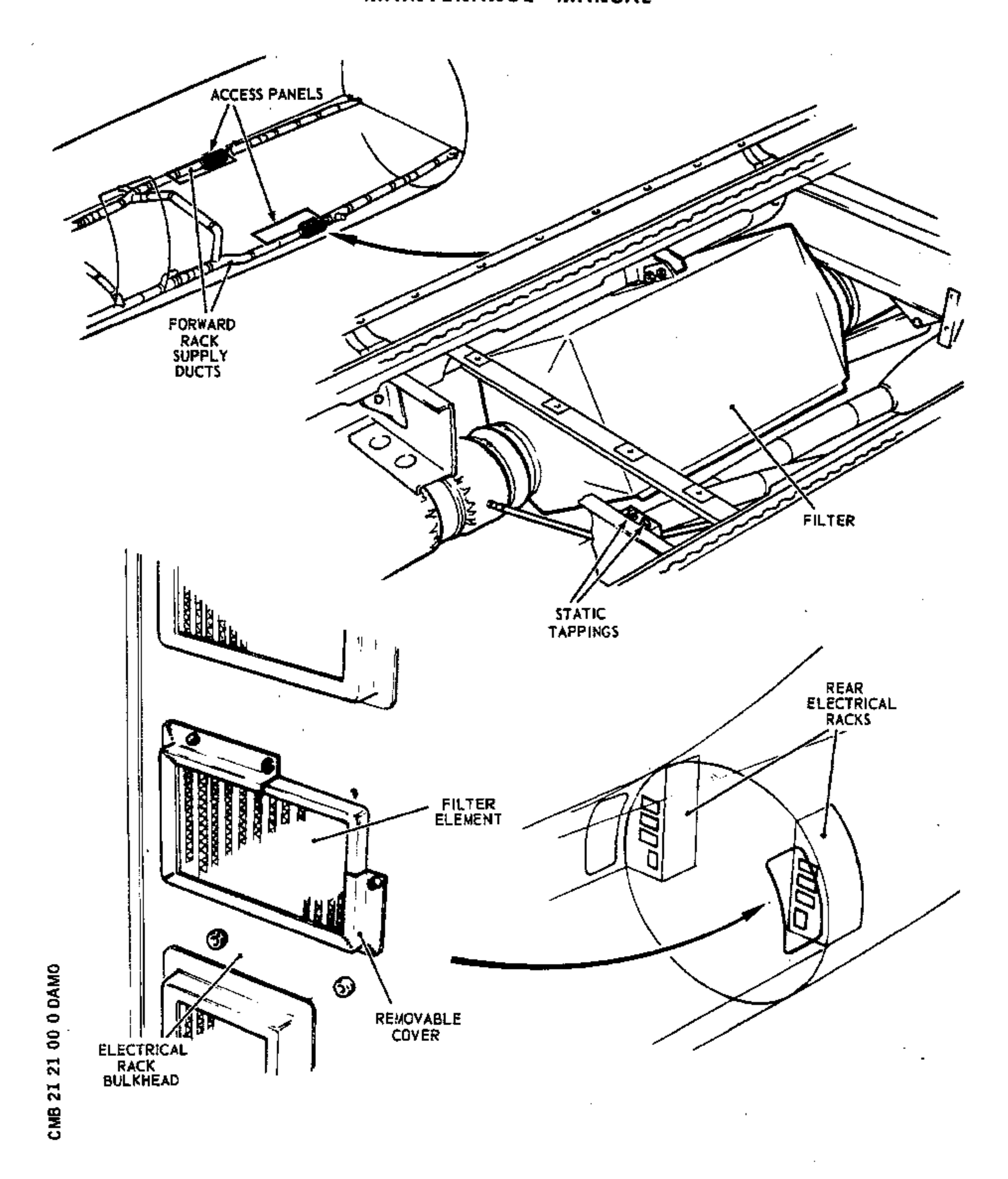
Duct Joints
Figure 003

3. Filters - Passenger Compartment (Ref. Fig. 004)

Two disposable filters, in the forward racks supply ducts, extract dust and smoke from the rack cooling air. Access to the filters for replacement of an element is obtained by lifting access panels in the floor. Static tappings across each filter allow ground checking of the pressure drop across the filter, without having to disturb the access panels or filter.

4. Filters - Rear Vestibule (Ref. Fig. 004)

There are four disposable filters in the forward bulkhead of each rear vestibule electrical rack. The filters are held in position by removeable covers.



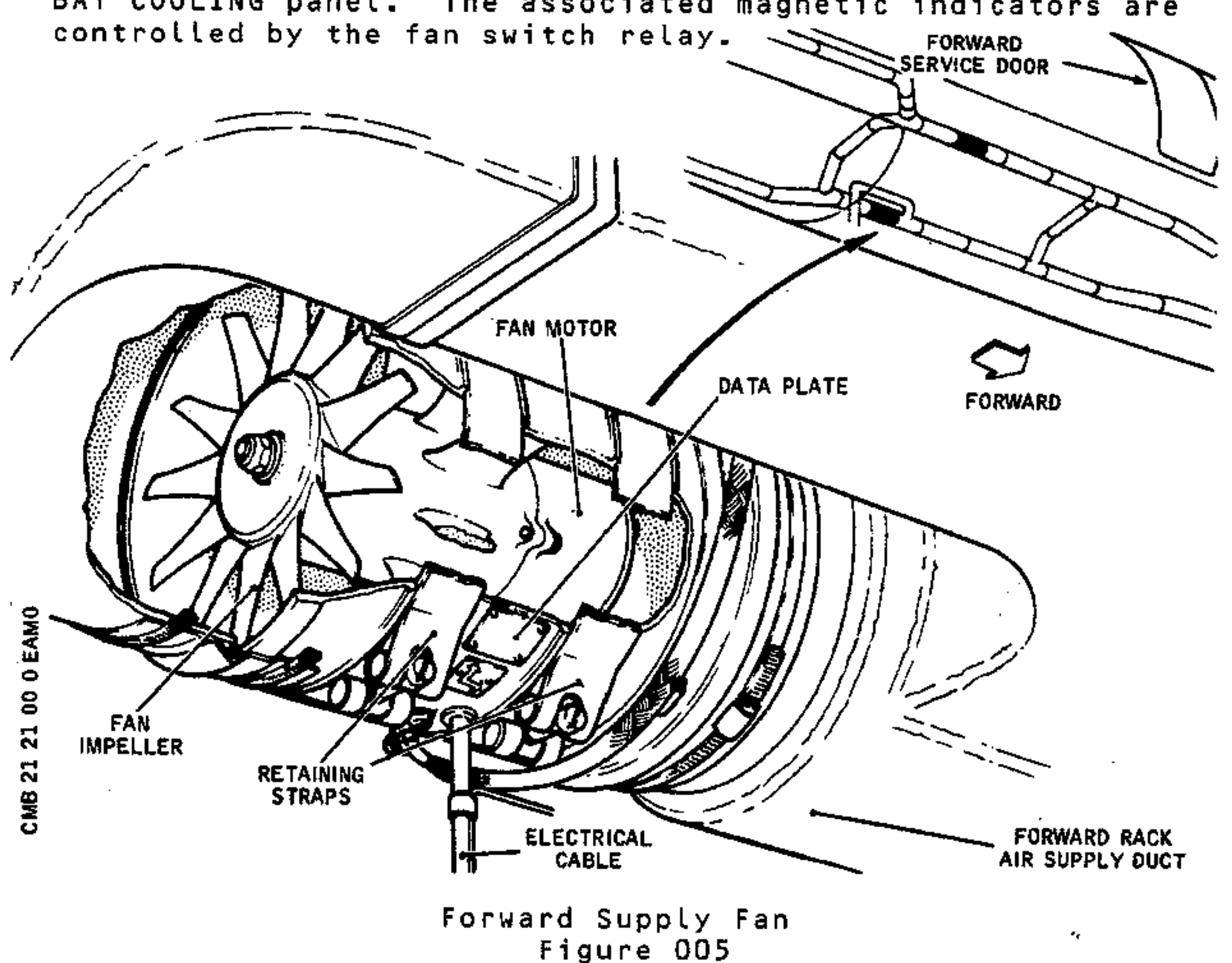
Extraction Air Filters
Figure 004

5. Fans - Forward Supply (Ref. Fig. 005)

Two axial-flow fans are bracket mounted, one on each side of the underfloor bay, zone 123/4, to extract air from the passenger compartment and to supply it to the forward racks and to the underfloor racks for cooling purposes.

The fan impeller is fitted to the shaft of an electric motor and is enclosed by a cylindrical casing. Electrical connection to the motor is made through a receptacle on the structure. A data plate, indicating the direction of rotation of the impeller is riveted to the casing.

Each fan motor operates from a 200V, three phase, a.c. supply, and both fans are controlled by a switch on the EQUIPMENT BAY COOLING panel. The associated magnetic indicators are controlled by the fan switch relay.



Forward Supply Fan
Figure 005

6. Fans - Forward Extraction (Ref. Fig. 006)

Three axial-flow fans are mounted in the multiple duct

arrangement of the extraction ducting in zone 125/6 to extract cooling air from the flight compartment, foward racks and underfloor racks. A non-return valve is fitted upstream of each fan.

Electrical connection is made via a connector on the fan case. A data plate indicates the direction of airflow. The motor operates from a 200V, three phase, a.c. supply. The fans are controlled by switches on the EQUIPMENT BAY COOLING panel.

When switch is set to AUTO the fans are automatically switched on and off with the cabin pressure control vacuum pumps. When the switch is set to ON the fans start irrespective of other conditions. The magnetic indicators are controlled by the fan control contactors and shows then the fans are running. When switch is set to OFF, the fans stop irrespective of other conditions.

7. Fans - Rear Extraction (Ref. Fig. 007)

Three mixed-flow fans are mounted on a common manifold below floor level, in zone 167/8 to extract cooling air from the rear equipment racking. They are controlled by three switches on the EQUIPMENT BAY COOLING panel. The left-hand outboard fan is for emergency use.

These fans are similar to those used in the forward racking air supply except that they are mixed-flow, smaller, and are open at the downstream end. The upstream end of the casing is recessed to house an O-ring seal and has a half V-flange to match the associated flange of the adjacent non-return valve.

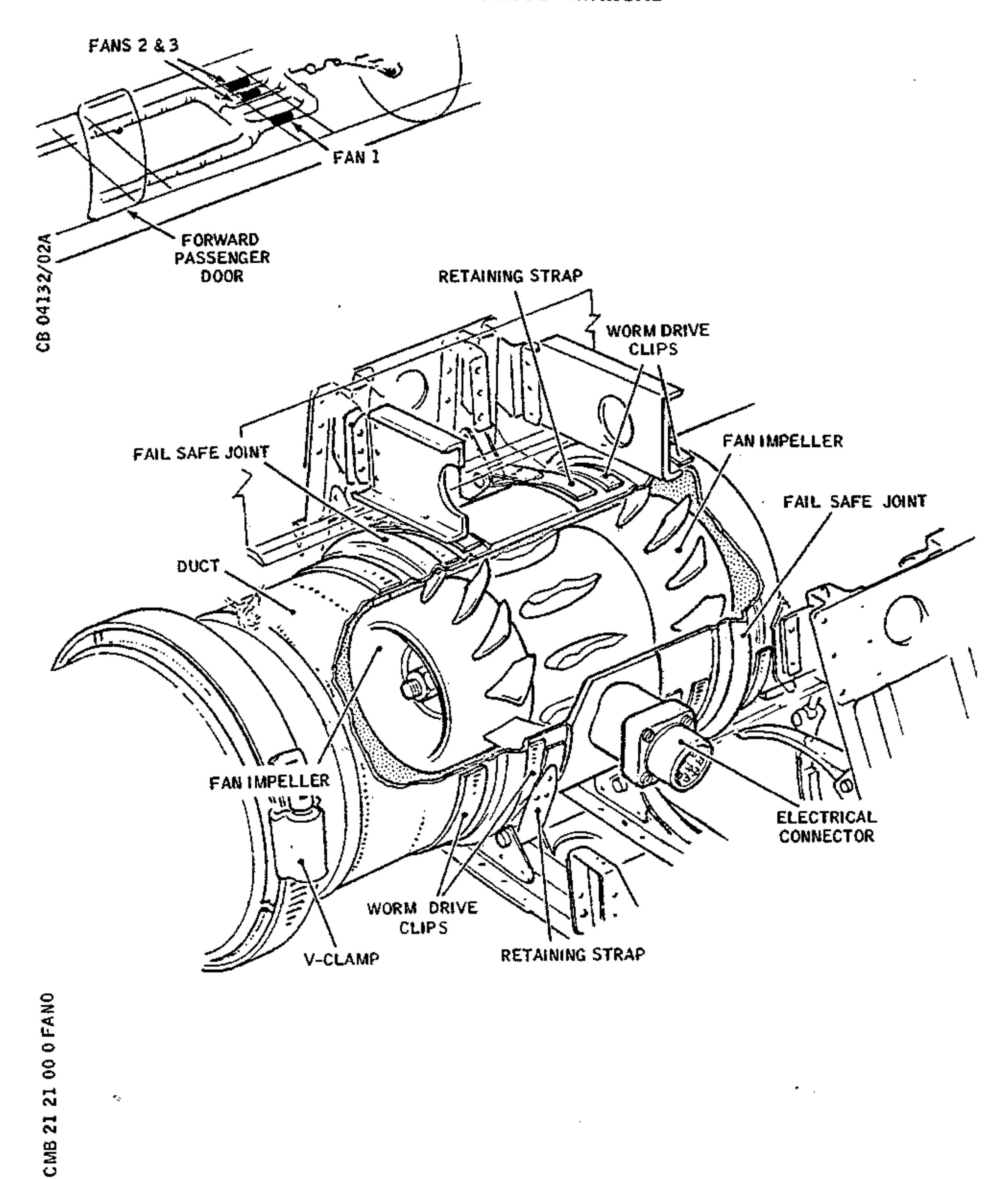
8. Non-Return Valves (Fans)

Non-return valves (NRV) are installed upstream of the two forward supply fans and the three rear extraction fans to prevent reverse airflow through the fans.

Each NRV comprises an intake ring with brackets at the top and the bottom which house a spindle. Hinged on the spindle is a pair of semi-circular flaps held closed against the intake ring by a spring.

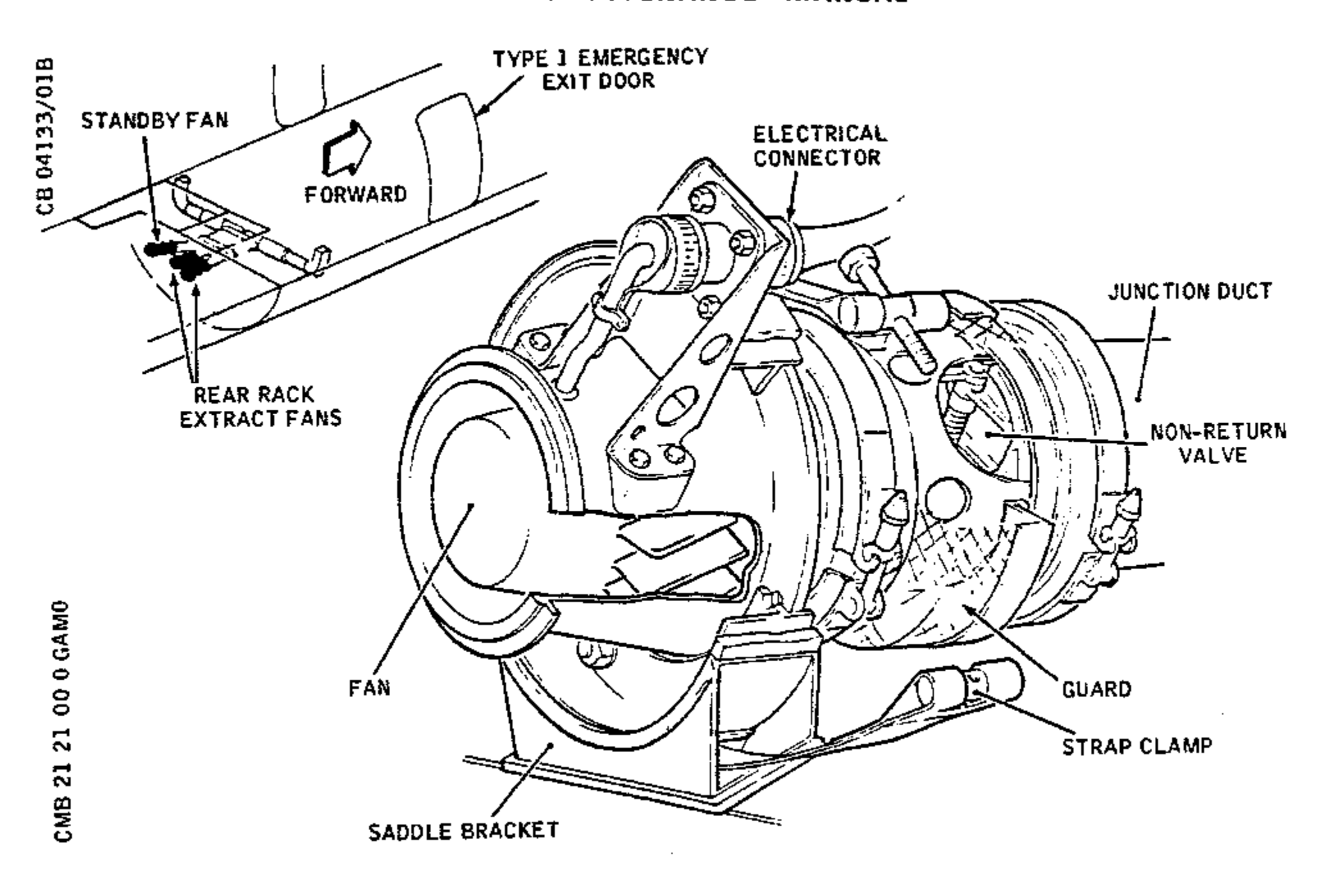
When a fan is operating, airflow through the NRV opens the flaps against spring pressure; when the fan stops, the valve flaps are closed by the spring, thus sealing off the duct.

9. Pressure Switches (Ref. Fig.008 and 014)



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Forward Extraction Fan
Figure 006



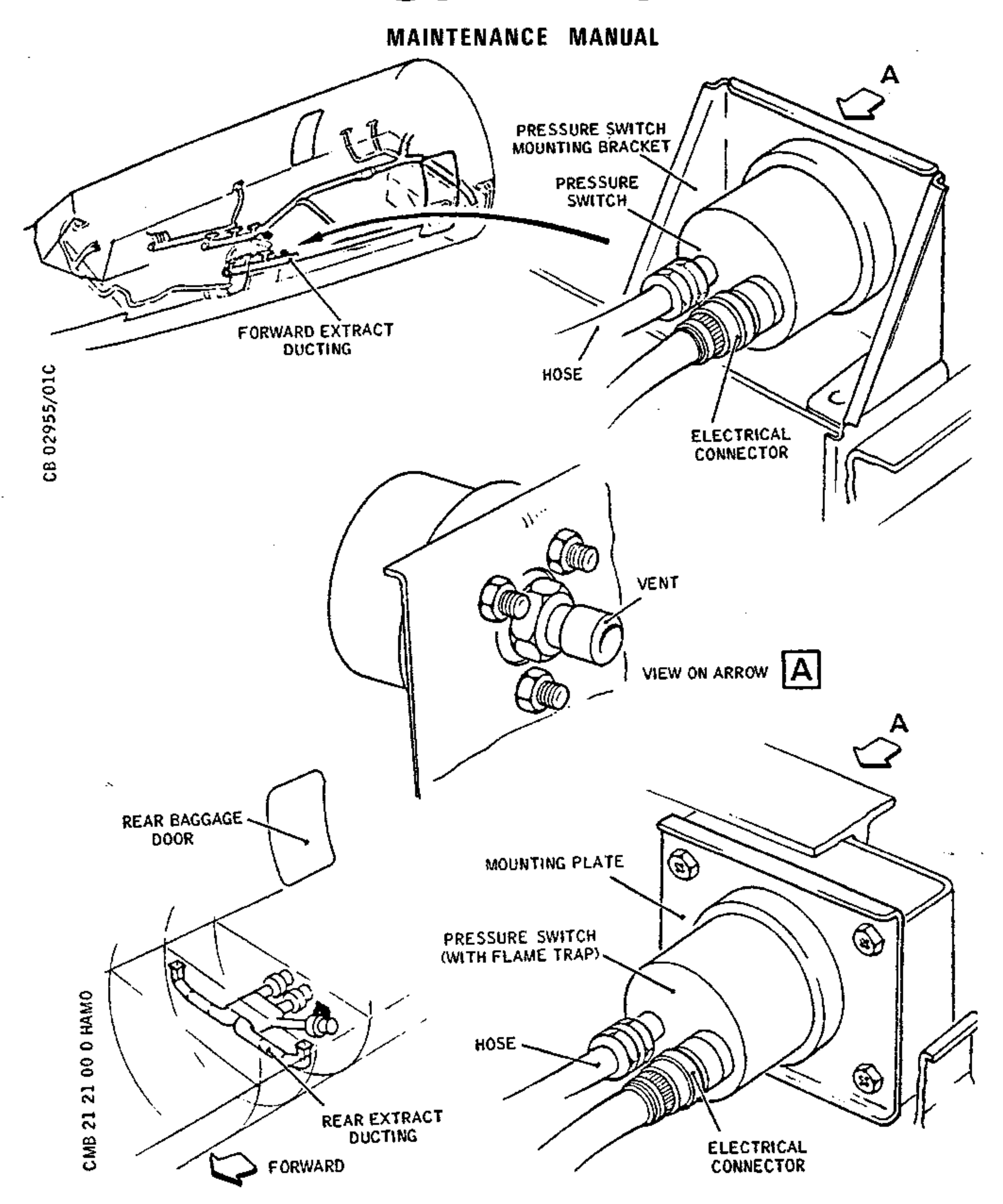
Rear Extraction Fan
Figure 007

There are three pressure switches, two in zone 123/4 and one in 153/4. The body of the switch is partitioned, to form two pressure chambers, by a spring biased diaphragm, which, when deflected operates the electrical switch. One chamber is connected by hose to the duct upstream of its associated fan, the other is open to ambient pressure.

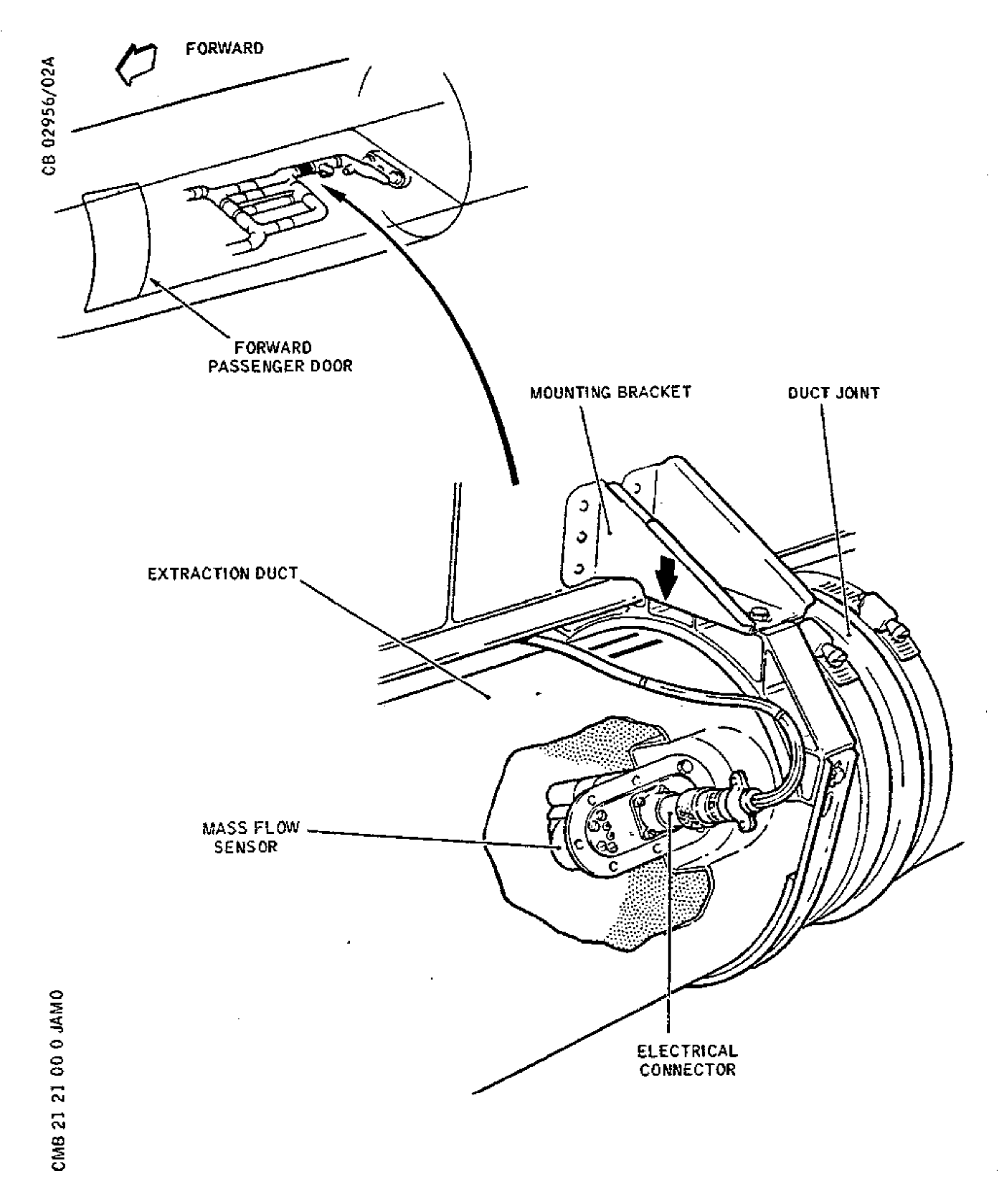
When a loss of airflow in the duct causes the pressure differential of the chambers to fall below a predetermined value, approximately equivalent to 50 per cent of the normal flow, the switch closes. This causes a caption on the equipment bay cooling panel to be illuminated, indicating a fall in system pressure. The rear extraction pressure switch includes a fitted flame trap.

10. Mass Flow Sensor (Ref. Fig.009 and 020)

A mass flow sensor, of the heated element type is mounted in the extraction duct projecting into the air flow downstream of the crossover duct section. The sensor operates a mass flow indicator in the equipment bay cooling panel via an amplifier (Ref. 21-21-73) mounted in the forward



Pressure Switches
Figure 008



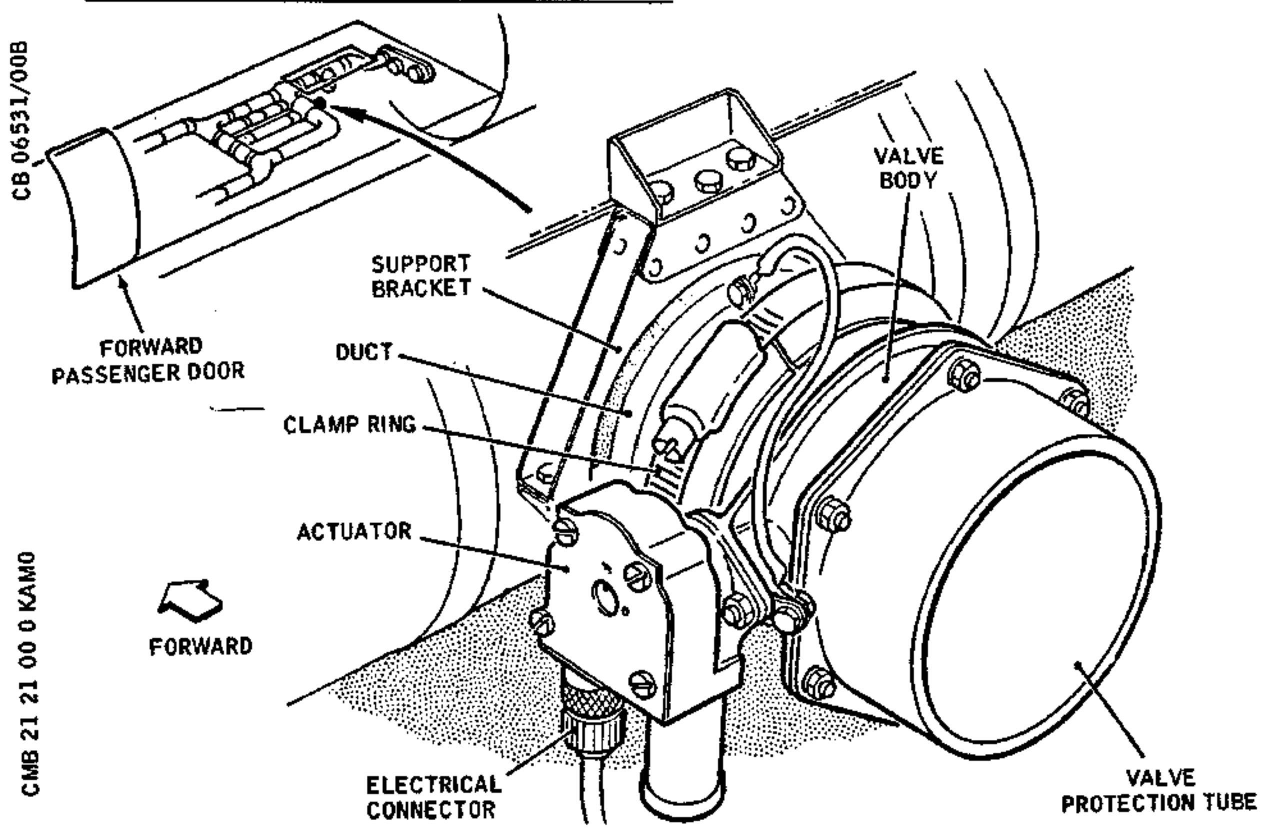
Mass Flow Sensor
Figure 009

equipment racks. The sensor is protected from overheating under 'no-flow' conditions, by a temperature detection circuit which restricts the power input. The amplifier has a test socket for maintenance purposes.

11. Outward Relief Valve

An outward relief valve (non-return valve) is located in a short bifurcated branch duct downstream of the mass flow sensor. This valve permits air to flow from the duct to the underfloor area when both the forward cabin discharge valves are closed or when they are acting as inward relief valves for the pressure hull.

12. Forward Emergency Relief Valve (Ref. Fig. 010)

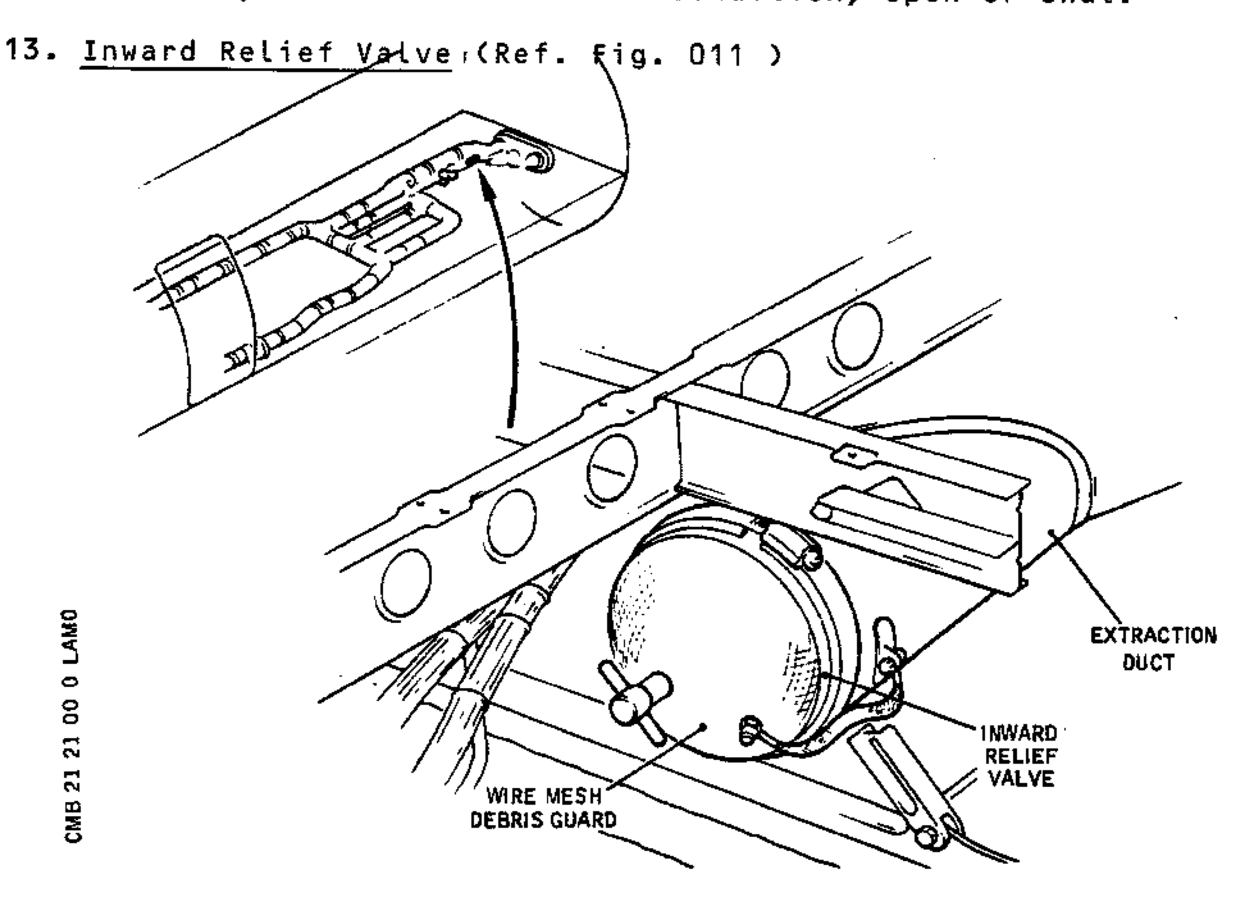


Forward Emergency Relief Valve
Figure 010

An electrically actuated emergency relief valve is located in a short branch duct downstream of the forward extraction fans. This valve, which is a butterfly type, is used as an emergency outward relief which permits a flow of air

from the forward extraction duct to the underfloor space when the fans do not generate sufficient pressure to open the spring-loaded outward relief valve. The valve actuator uses a 28V d.c. electrical supply, and is controlled by a switch on the equipment bay cooling panel. The associated magnetic indicator is controlled by the actuator limit switches, and shows the valve condition, open or shut.

13. Inward Relief Valve (Ref. Fig. 011)



Inward Relief Valve
Figure 011

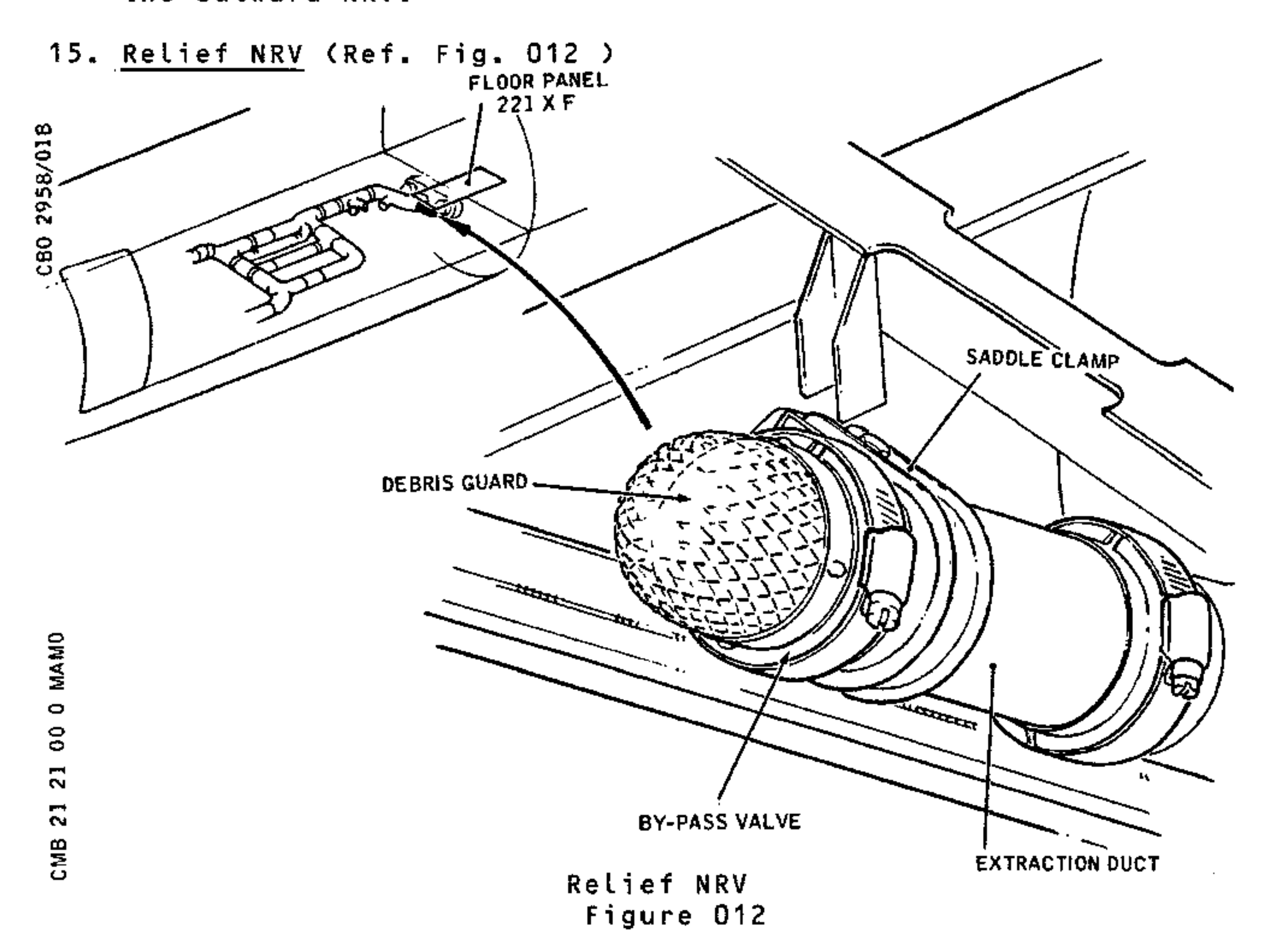
An inward relief valve which incorporates a wire mesh debris guard, is fitted in a short branch duct of the extraction duct, between the underfloor outward relief valve and the by-pass valve. The valve automatically limits the pressure differential, in the event of a forward cabin discharge valve failing open, by allowing air to enter the duct.

14. Bay Ventilation Bleed

Ventilation of the forward underfloor area is provided through

a perforated disc, which is fitted to the stub duct next to the outward NRV.

15. Relief NRV (Ref. Fig. 012)



Relief NRV
Figure 012

A 3 in non-return valve, for the improvement of fan characteristics, enables air to pass into the forward underfloor area from the extraction duct. The valve is located on the extraction duct upstream of the forward cabin discharge valves and has a debris guard fitted over the outlet.

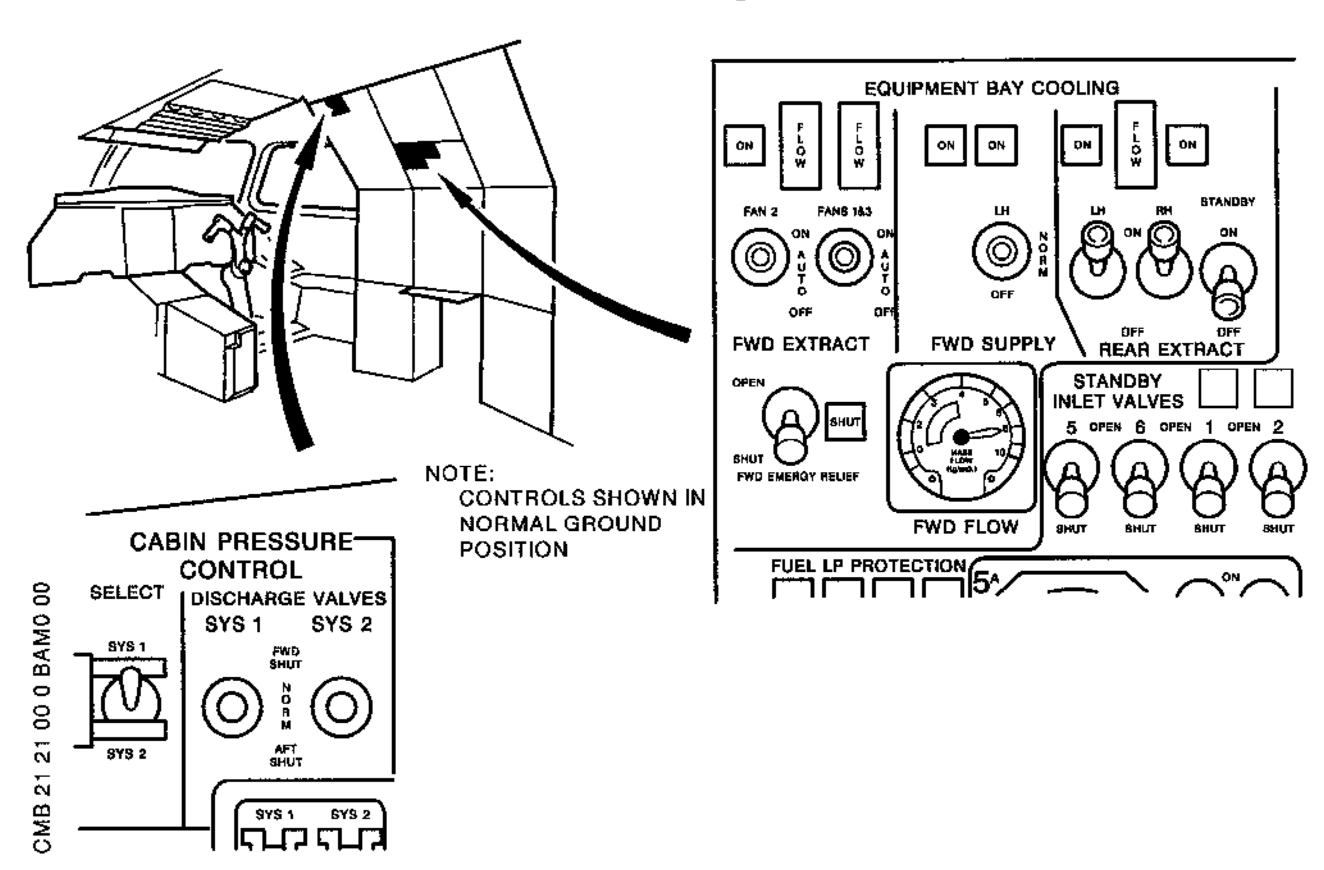
16. Non-Return Valves (INS and WR Emergency Supply)

In the event of supply or extraction fan failure, cabin air is admitted to the INS and WR crates through resin bonded glass cloth flap valves. The two INS NRV's are located in the sidewalls, behind the forward amenity stowage on the left and behind the forward toilet on the right. The WR NRV is mounted on the floor at the rear end of the forward equipment rack. The valves are protected by wire mesh grilles which are bonded together as one component complete with flap valve

and surround.

17. Operation

A. Controls and Indication (Ref. Fig. 013)



R Controls and Indicators
Figure 013

The controls and indicators are located on the equipment bay cooling section of panel 2-214 at the 3CM station. All control switches are of the locked toggle type, and the toggle must be pulled before it can be used.

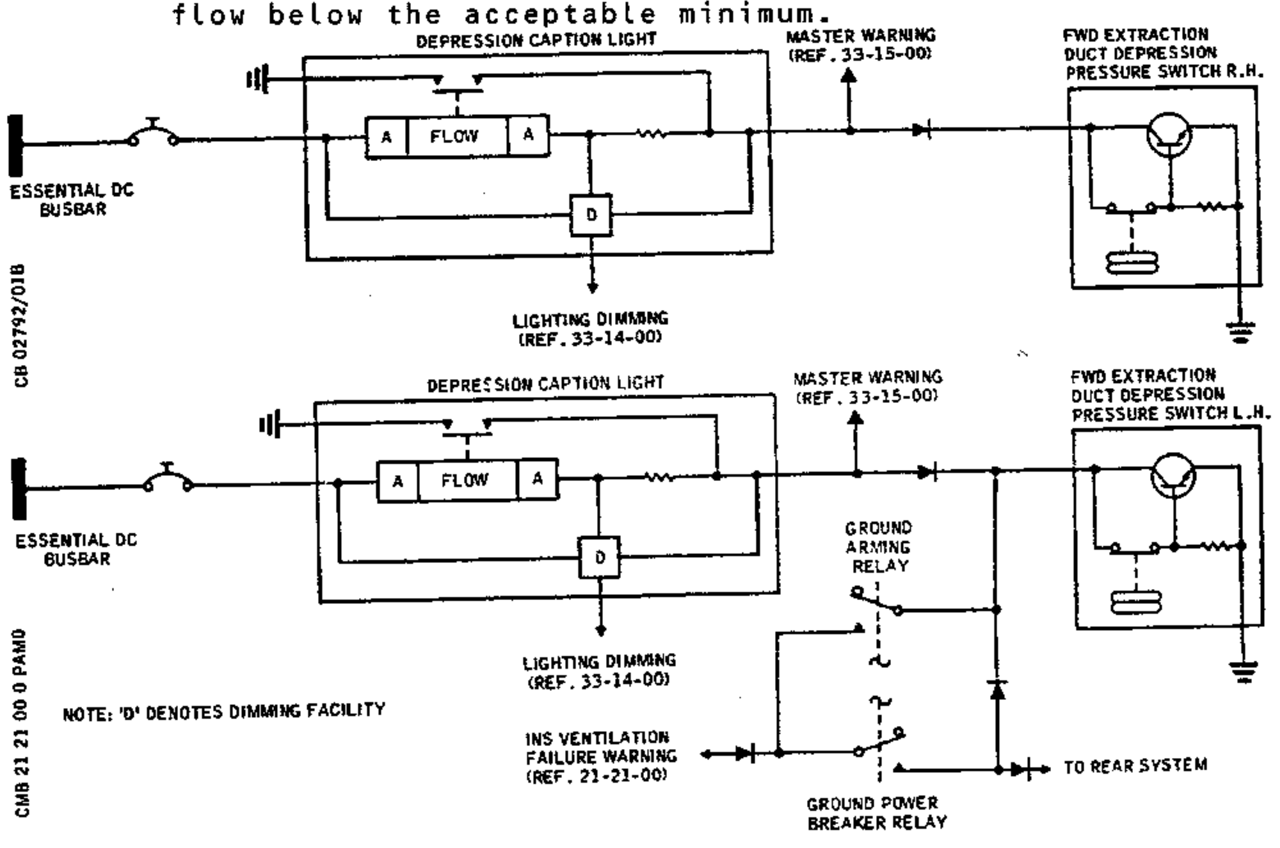
Magnetic indicators, displaying ON or OFF, indicate fan operation (Ref. Fig. 015) and, except for the forward extraction fans, are controlled via contacts on the respective fan contactors. The indication for the forward extraction fans is controlled via inter-connected relays. Amber FLOW caption lights indicate air flow failure in the forward and rear extraction ducts (Ref. Fig. 014) and the master warning system gives an AIR warning. The rear extraction standby fan has no separate indicator but the FLOW caption indicates its operation.

The ground arming relay permits use of the air flow failure system for inertial navigation system ventilation failure warning. When on the ground with the power on, the landing gear weight switch energizes the ground call horn circuit if there is no air flow in either the forward or rear extraction systems (Ref. Fig. 019).

After SB 21-039 For A/C 001-005,

If either a forward or rear equipment bay cooling failure is sensed, the ground power breaker automatically trips after a delay of 45 seconds. A manual override switch is provided for maintenance.

Indication of air flow in the forward extraction duct is shown on a forward FLOW mass flow indicator which reads from 0 to 1 kg/second. An amber segment indicates air flow below the acceptable minimum.



Flow Indication - Typical
Figure 014

A magnetic indicator for the HYD BAY FAN is also on this panel (Ref. 21-26-00).

The caption lights incorporate diodes to prevent feedback when a filament test is carried out. They also incorporate a dimming facility. Pressing the cap of the FLOW caption lights checks the serviceability of the associated AIR master warning channel.

B. Functional Description

At all times when the electric/electronic systems are operating, the rack cooling systems must also be operating. With the aircraft on the ground, when the busbars are energized, the landing gear weight switch relay automatically starts the forward extraction main fans. Conditioned air is supplied via the air distribution system by an air ground-trolley, or from the aircraft air generation systems (Ref. 21-10-00).

In the absence of an air ground-trolley and with the aircraft air generation system shut down, air can be drawn into the rack cooling ducts, by the fans, through the open cabin doors.

Under normal ground operating conditions, air is drawn by fan from the passenger compartment and is ducted to the forward equipment racks and the underfloor equipment racks to cool the electrical equipment. This air is then extracted by fan, which also extracts air from the flight compartment, and is ducted to an underfloor plenum chamber. The air is then discharged overboard via the forward cabin discharge valves. The non-return valve of an inoperative fan prevents air being drawn through the fan. This would make it windmill unnecessarily and the air would bypass the racks, allowing the equipment to overheat.

With all extraction fans inoperative, loss of airflow in the ducting causes the switch contacts in the associated pressure switches to close (Ref. Fig. 014). This completes the electrical cicuit to the FLOW caption lights, causing them to illuminate amber and to give an AIR master warning. A cabin differential pressure of 1 psi (69 mbar) or more is required to maintain airflow in flight with the fans off.

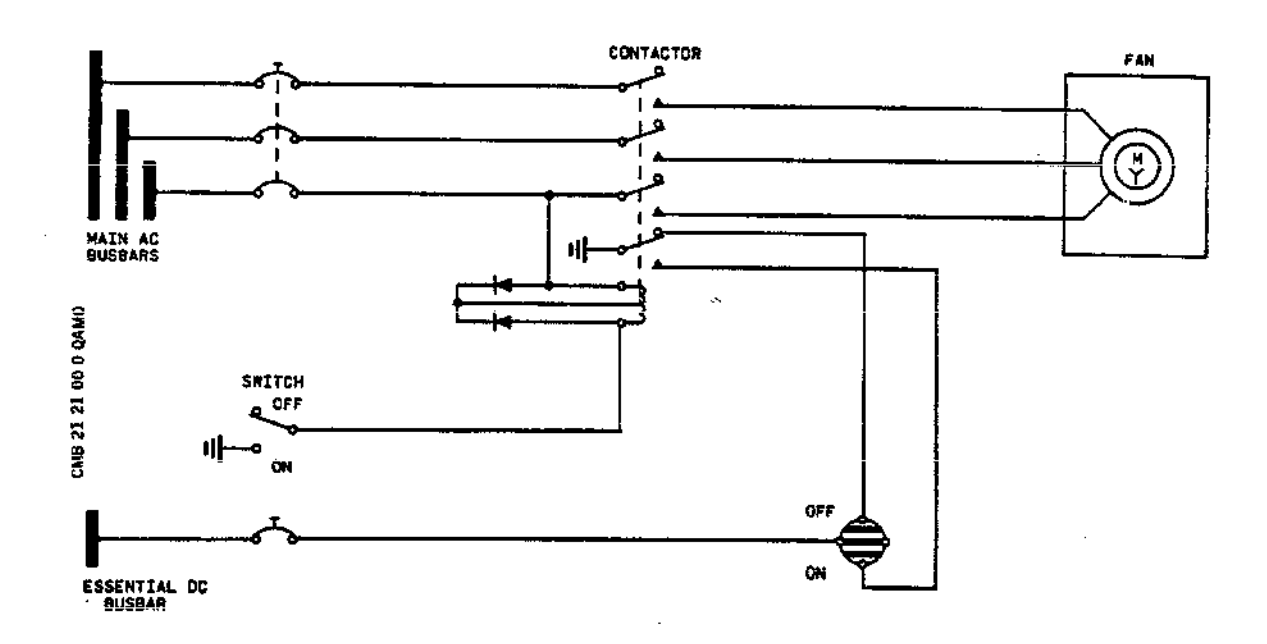
In flight when the cabin differential pressure reaches 2 psi (0.136 bar), the forward extraction fans are switched off, and the extract flow is maintained entirely by cabin differential pressure via the forward cabin

discharge valve.

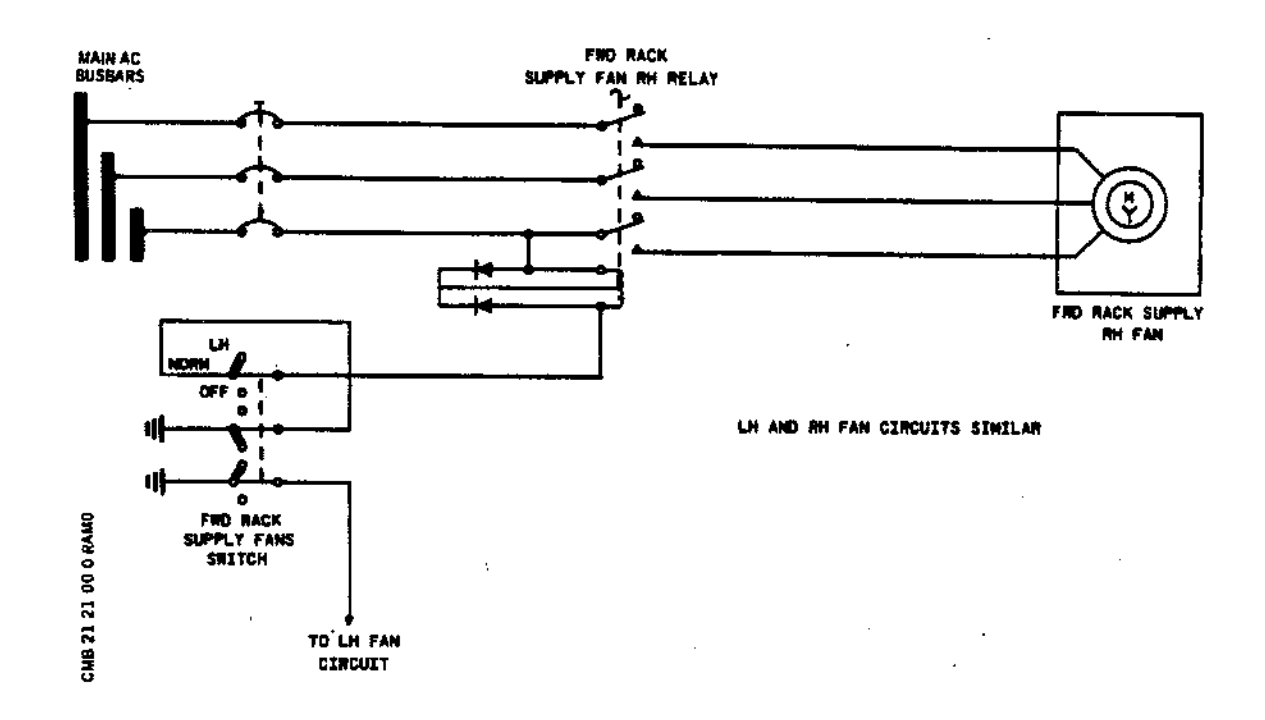
The rear vestibule electronic rack cooling air passes into the racks via filters in the enclosure panels. After passing around the equipment, it is drawn by fans into an underfloor manifold. The exhaust air from the fans is discharged in the area between the cabin floor and the pressure panels. A loss of airflow in the system operates a pressure switch in the same manner as in the forward system (Ref. para.B(4)). To restore the airflow in the system, the standby fan must be switched on. The non-return valve fitted to each fan prevents an airflow through the fan should it fail to operate.

C. Forward Supply Fans (Ref. Fig.016 and 015)

Both fans are controlled by a LH, NORM, OFF switch labelled FWD SUPPLY which, through a relay, controls the electrical supply to the associated fan motor and magnetic indicator.



Fan Indication - Typical
Figure 015



Forward Supply Fans - Control
Figure 016

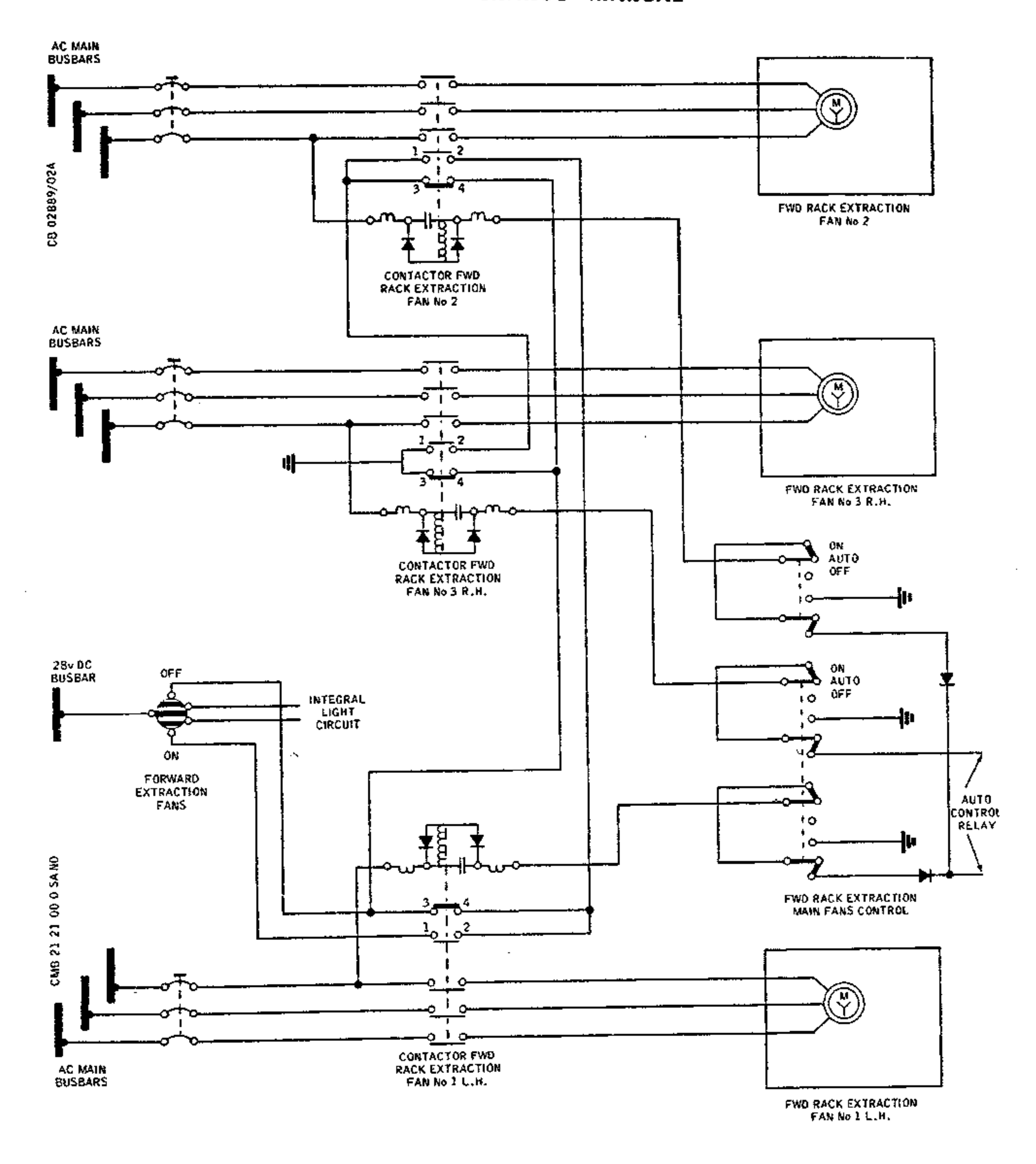
D. Forward Extraction Fans

For forward extraction fans control and indication, a main ON-OFF-AUTO switch controls a contactor supplying the fan (Ref. Fig. 017). When the control switch is set at AUTO it is subject to the landing weight switch relay and forward extraction auto-control relays, which in turn are controlled by the pressure switches in the forward vacuum pump pressure regulation system.

These switch off the extraction fans when the cabin differential pressure is above 2 psi (0.136 bar) and on when below 2 psi. The fan indication circuit operates by auxiliary contact sensing in combination with the appropriate circuit breakers.

Forward extraction fan magnetic indicators display ON when the forward extraction fans are operating and OFF when these fans are not operating.

The depression pressure switches in the forward

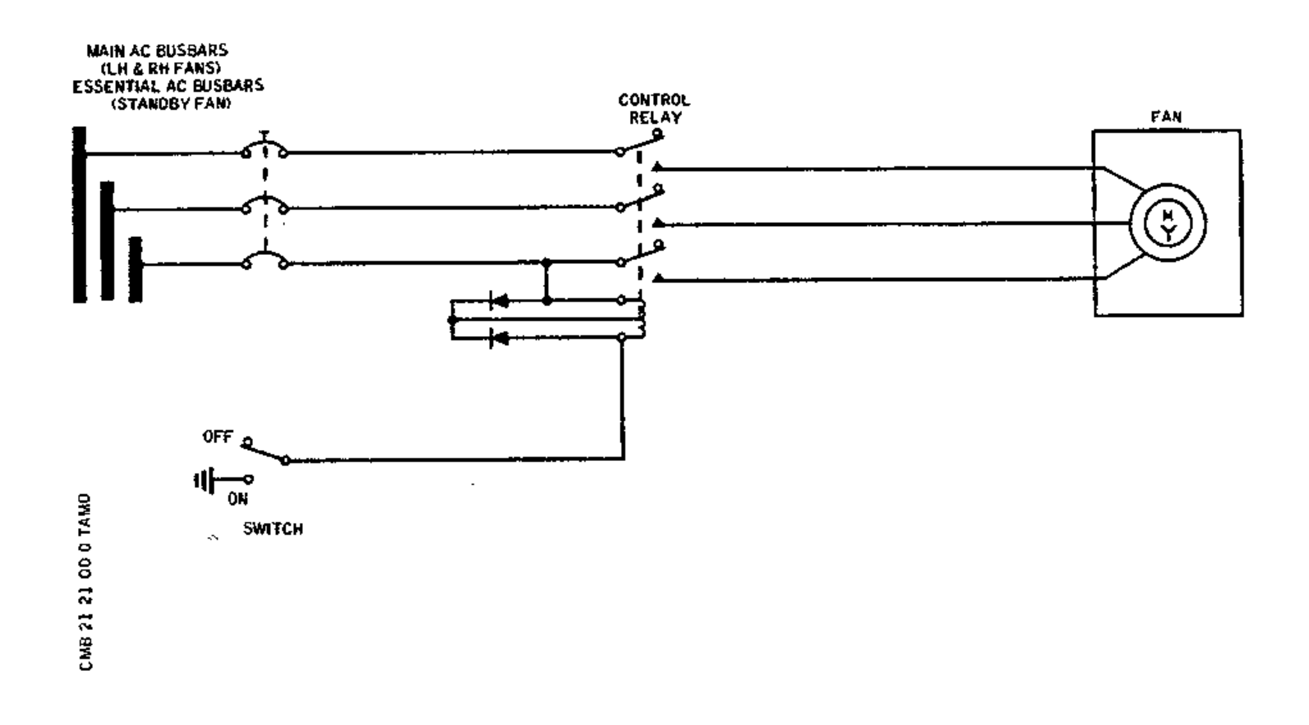


Forward Extraction Fans - Control and Indication
Figure 017

extraction ducts, control the corresponding amber FLOW caption lights and outputs to the master warning system (Ref. 33-15-00).

E. Rear Extraction Fans

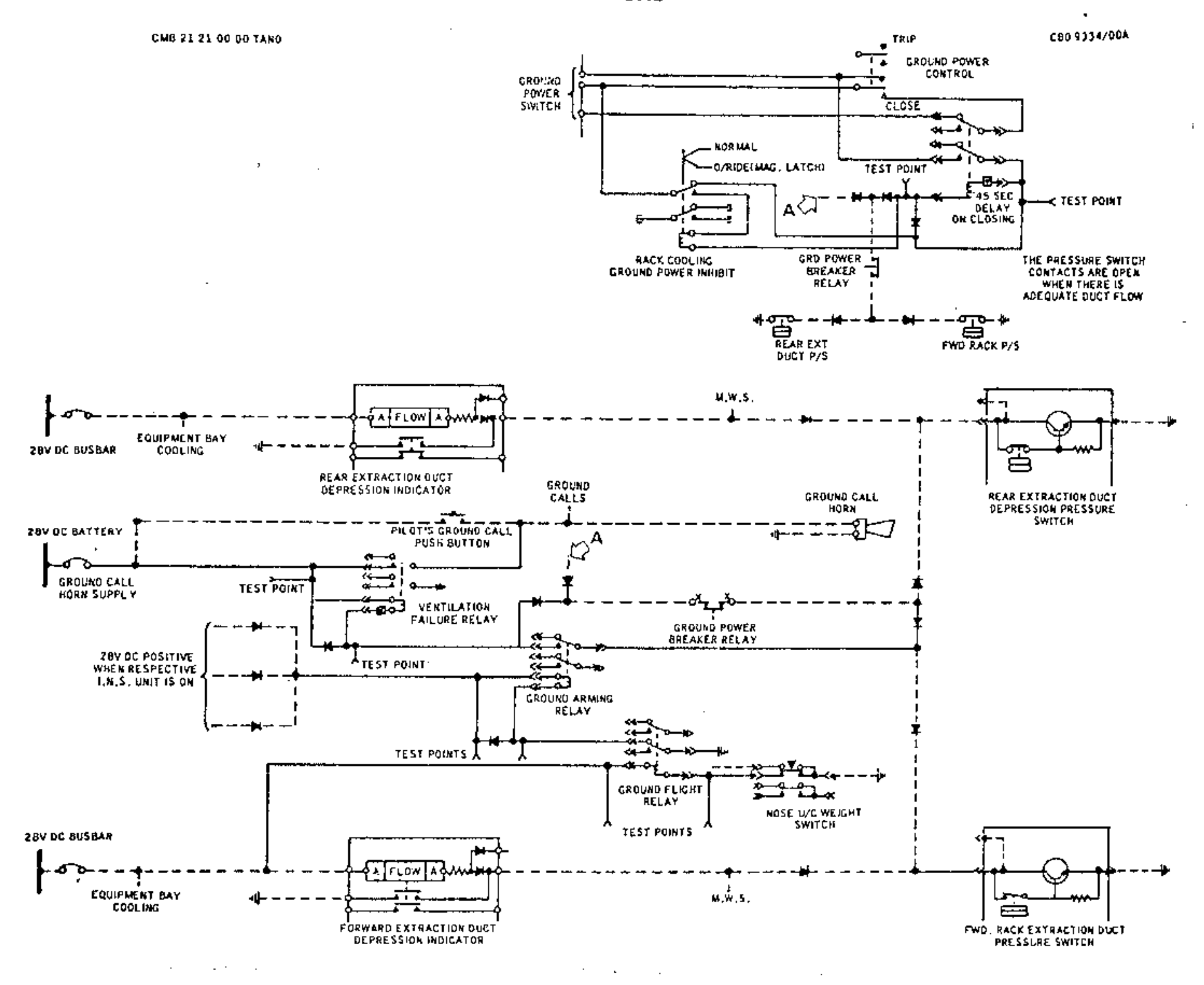
Control of each fan is identical, the electrical supply to the fan motor being controlled by an ON-OFF switch (Ref. Fig. 018). The left and right hand fan indication circuits operate by auxiliary contact sensing in combination with the appropriate circuit breakers. The standby fan has no associated indication.



Rear Extraction Fans - Control
Figure 018

F. Forward Rack Extraction Mass Flow Indication

The forward rack extraction mass flow indication system (Ref. Fig. 020) power supply, differential amplifier and protection and switching circuits are mounted on two boards. These are contained in a single elfin ATR case, on shelf 9-216, in the flight compartment RH equipment racking next to the third crew member's station.



INS Ventilation Failure Warning - Schematic
Figure 019

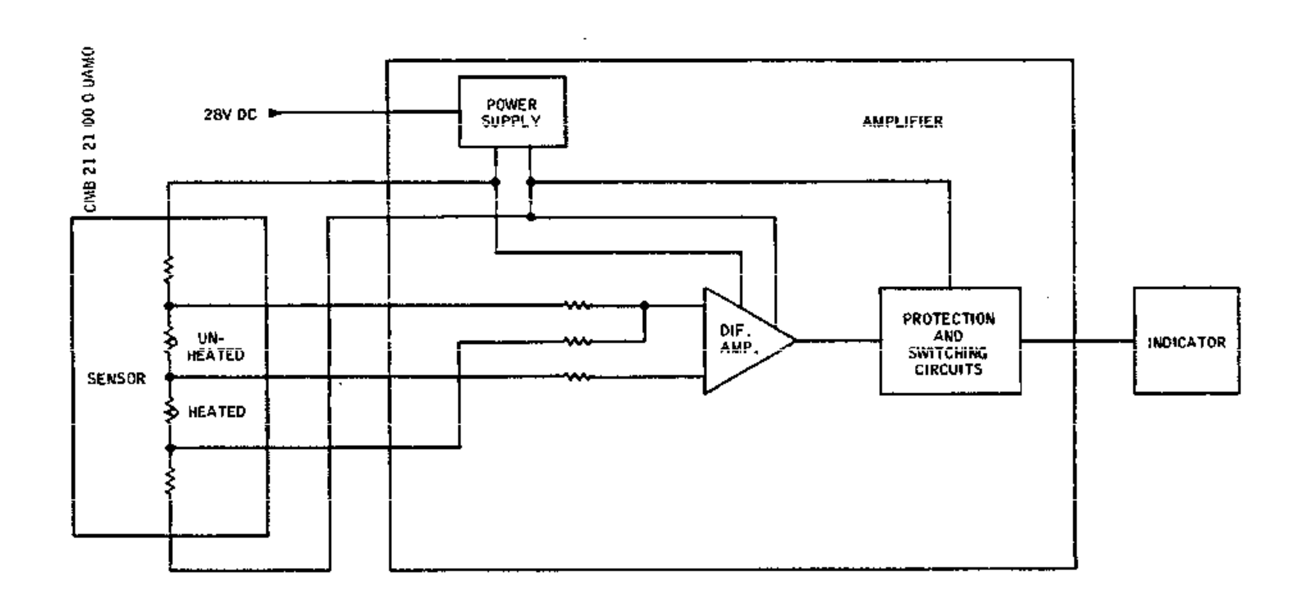
R

28V d.c. is applied to the amplifier power supply circuits which, in turn, supply the power required for the sensor/amplifier bridge circuit, the differential amplifier and the protection and switching circuits.

The differential amplifier sums and amplifies signals from the sensor to provide an output for the flow indicator.

The protection circuit is activated if the heated element in the sensor becomes too hot when the mass flow is low; this reduces the power to the heated element. The amplifier then gives a constant low output.

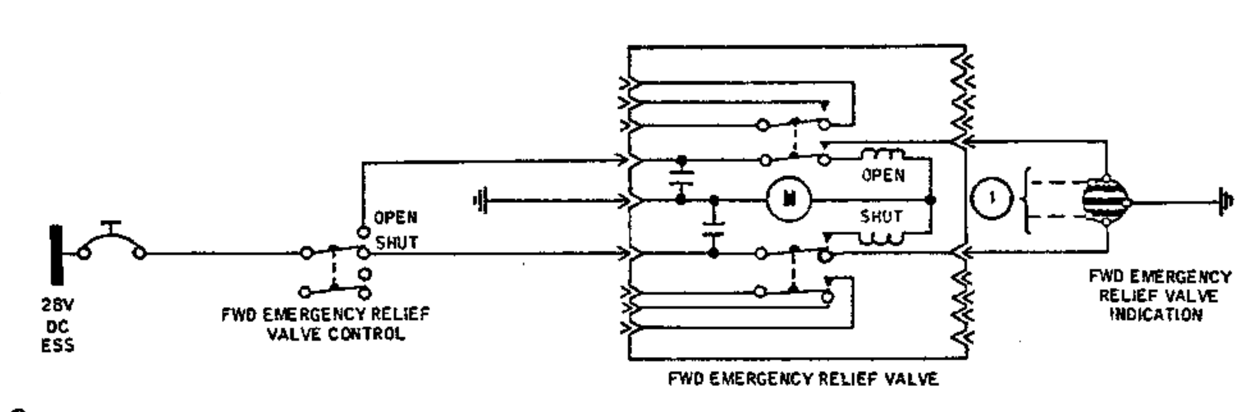
A test connector on the front of the elfin case facilitates maintenance.



- Forward Rack Extraction Mass Flow Indication
- Simplified Block Schematic
Figure 020

G. Forward Emergency Relief Valve Control

An OPEN SHUT switch directly controls the electrical supply to the emergency relief valve (Ref. Fig. 021). Internal switches in the valve control the associated magnetic indicator.



Forward Emergency
Relief Valve - Control and Indication
Figure 021

H. Power Supplies

SERVICE	BUSBAR	CIRCUIT BREAKER PANEL
Forward supply fan LH	No.2 Main 200 V ac	13-215
Forward supply fan RH	No.4 Main 200 V ac	14-216
Forward extraction Fan 1	No.l Main 2000 V ac	14-215
Forward extraction Fan 2	No.3 Main 200 V ac	13-216

SERVICE	BUSBAR	CIRCUIT BREAKER PANEL
Forward extraction Fan 3	No.4 Main 200 V a.c.	14-216
Rear extraction fan - LH	No.2 Main 200 V a.c.	13-215
Rear extraction fan - RH	No.4 Main 200 V a.c.	14-216
Rear extract fan - Standby	No.2 Essential 200 V a.c.	2-213
All supply and extraction fans - indication forward and rear extraction duct pressure switches	'B' Essential 28 V d.c.	5-213
Emergency relief valve	'A' Essential 28 V d.c.	1-213
INS Ventilation Fail Warning	'A' Battery 28 V d.c.	16-215
Flow indication system	'A' Essential 28 V d.c.	1-213

R

AIR EXTRACTION - TROUBLE SHOOTING

WARNING: OBSERVE THE ELECTRICAL PRECAUTIONS DETAILED IN 24-00-00.

CAUTION: BEFORE OPENING ANY AIR EXTRACTION DUCTING DISCONNECT ALL ELECTRICAL POWER. THIS IS TO SAFEGUARD ELECTRONIC EQUIPMENT WHILE THE COOLING AIR SYSTEM IS INOPERABLE.

DO NOT APPLY WEIGHT TO DUCTING.

1. General

Faults are dealt with on a probability basis and identified as a result of testing. A defect can be isolated with the aid of trouble shooting procedures (Ref. paras 3,4 and 5), and traced through OK and NOT OK paths to the appropriate charts or other rectification action as necessary. When a defect occurs carry out the appropriate rectification action, then repeat the previous tests which involved the faulty equipment or wiring.

Bracketed numbers in the procedures and charts indicate items on the components identification table (Ref. Table 101). The table provides information, including component locations required for rectification. Component location also indicates the possible necessity of repositioning certain items of ground service equipment. Each chart specifies any ground equipment required for that particular task.

Procedures dealing with electrical trouble shooting are based on the initial assumption that wiring is serviceable, and that all associated circuit breakers are set and electrical power to the circuit breakers is available, unless otherwise stated. If the fault is not found in the equipment, check the wiring in accordance with the Wiring Diagram Manual, (Ref. Table 101).

The forward supply system and the extraction systems can be checked independently and the extraction systems can be checked without a ground air supply. It is recommended however, that a ground air supply be connected before starting trouble shooting procedures. Cabin doors may be open or shut, except for the ground checks in the pressurised flight mode.

The mechanical trouble shooting procedures in Charts 109-114 require the fans and indicators to be operable. Faults in these components must be dealt with by the procedures in Charts 101-108.

2. Preparation

NOTE: Air flow rates are to be within ± 5 per cent and duct static pressures within ± 10 per cent quoted in the trouble shooting procedures and charts, unless otherwise stated.

A. Make available electrical ground power (Ref. 24-41-00).

B. Make available a ground pre-conditioned air supply (Ref. 12-14-21).

C. Ensure that the associated circuit breakers are set (Ref. Table 101).

D. Ensure that the following switches on the equipment bay cooling panel (2-214) at the third crew member's station are at their normal ground settings:

SWITCH	GROUND SETTING
FWD SUPPLY (34)	NORM
FWD EXTRACT:	
FAN 1 & 3 (26)	AUTO
FAN 2 (25)	AUTO
EMERG'Y RELIEF (31)	SHUT
REAR EXTRACT:	
LH AND RH (42),(40)	ON
STANDBY (44)	OFF

E. Place the CABIN PRESSURE CONTROL DISCHARGE VALVES switches SYS 1 and SYS 2 on panel 1-214 to 'NORM'.

3. Trouble Shooting (Forward Supply)

Trouble Shooting (Forward Supply)

A. Prepare to trouble shoot (Ref. para. 2)
With FWD SUPPLY fan switch (34) at "OFF", check that both MI's (37) and (38) show "OFF".

- NOT OK: If either MI shows cross hatch, change relay (54) or (55). If still cross hatch, check for voltage (28V) on terminal B of the indicator. If voltage present, change indicator. If no voltage, check wiring and C/B's (4) or (5).
- OK: go to B.

B. Set FWD SUPPLY fan switch (34) to "NORM" and check that both MI's show "ON".

- NOT OK: If MI still indicates "OFF", check C/B's (4) or (5).
  - OK: Change relay (54) or (55). If fault is still present, check fan control switch (34), check relay test points 8A and 8B for earth. If switch OK, change MI.
  - NOT OK: If C/B (4) or (5) is tripped, disconnect plug from fan and reset C/B. If voltage is present on all phases, change fan. If voltage is missing on one or all phases, change relay (54) or (55). If voltage still missing, check C/B's (4) and (5).
- OK: (continued)

C. Set FWD SUPPLY fan switch (34) to LH and check that the RH indicator shows "OFF" and the LH indicator shows "ON".

- OK → continue to D.
- NOT OK → If any other result, check fan control switch (34).

D. Check that the pressure drop across the filters is less than 7 in H20 with both fans running.

- OK → continue to E.
- NOT OK → If pressure drop across a filter is more than 7 in H20, change the filter.

E. Check that the debris guards are clean and serviceable.

- OK → continue to F.
- NOT OK → Remove,clean and refit the debris guards.

F. Check duct static pressures - Table 102 Figure 101.

- NOT OK →
  1. Check ducting for leakage or blockage according to diagnosis of static readings - See notes.
  2. If ducting OK, check fans (35), (36) for damaged blades and change as necessary.

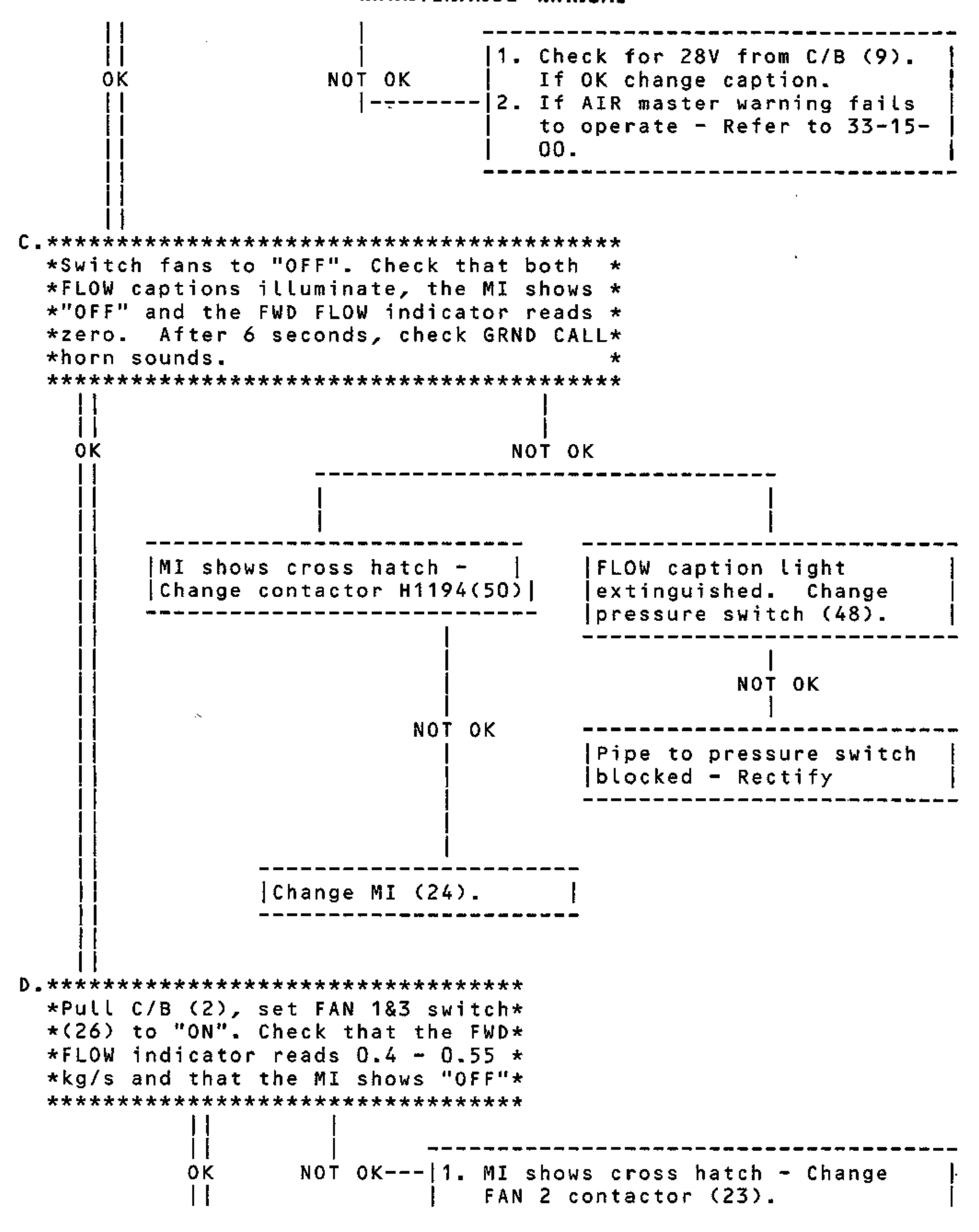
Notes:

1. High +ve reading indicates blockage downstream of test point(s).
2. Low +ve reading indicates blockage upstream, leakage either side, damaged fan(s).
3. High -ve reading indicates blockage upstream of test point(s).
4. Low -ve reading indicates blockage downstream, leakage either side, damaged fan(s).

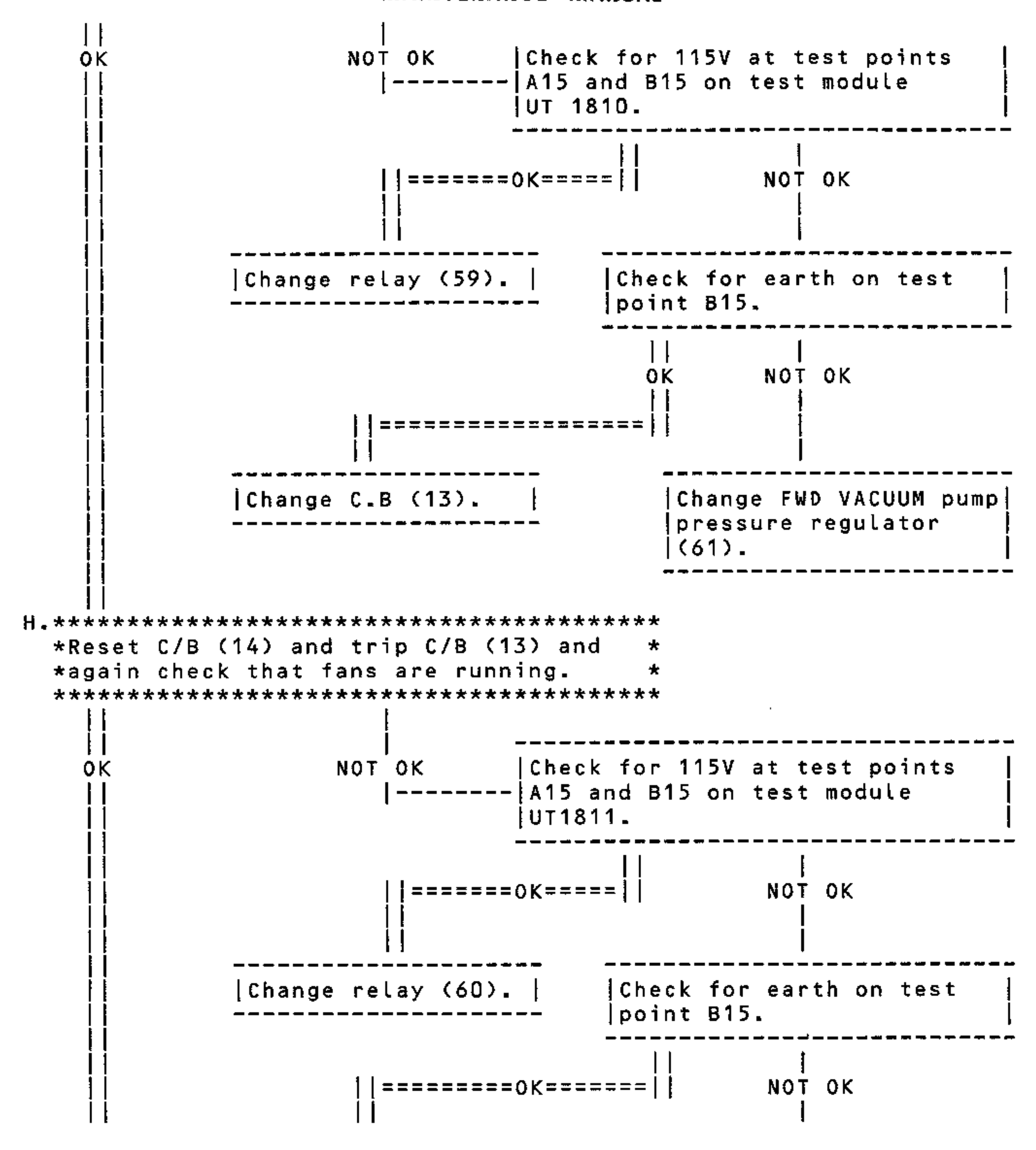
4. Trouble Shooting (Forward Extraction)

Trouble Shooting (Forward Extraction)

```
A.*****************************************
  *Prepare to trouble shoot (Ref. para. 2)*
  *Set FWD EXTRACT FAN 1 & 3 switch (26)  *
  *and FAN 2 switch (25) to "AUTO"        *
  *EMERGY RELIEF valve switch (31)        *
  *to "SHUT" (normal ground state). Check *
  *that:                                  *
  * 1. Both FLOW captions are extinguished*
  * 2. Fan MI (24) shows "ON".            *
  * 3. FWD FLOW indicator (18) reads 0.85 *
  *    - 1.1 Kg/s.                        *
  *****************************************
       ||        |
       ||        |         ----------------------------------------
       OK      NOT OK     |1. MI shows "OFF", other                |
       ||        |--------|   indications normal - Chart 101.      |
       ||                 |2. FWD FLOW indicator reading incorrect |
       ||                 |   (high or low), other indications     |
       ||                 |   normal - Chart 102.                  |
       ||                 |3. FLOW caption illuminated, other      |
       ||                 |   indications normal - Chart 103.      |
       ||                 |4. MI shows "OFF". FWD FLOW indicator   |
       ||                 |   reading low - Chart 104(a)(b)(c)(d). |
       ||                 |5. Both FLOW captions illuminated, MI   |
       ||                 |   showing "ON", FWD FLOW indicator     |
       ||                 |   reading normal or high - Check       |
       ||                 |   manifold upstream of fans for leak and|
       ||                 |   rectify.                             |
       ||                 |6. Both FLOW captions illuminated,MI    |
       ||                 |   showing "ON", FWD FLOW indicator     |
       ||                 |   reading low - Chart 105.             |
       ||                 |7. Both FLOW captions illuminated, MI   |
       ||                 |   showing "OFF", FWD FLOW indicator    |
       ||                 |   reading zero - Chart 106.            |
       ||                  ----------------------------------------
       ||
B.*****************************************
  *Press FLOW captions.  Check that the   *
  *caption lights illuminate, the AIR     *
  *master warning activates and audio gong*
  *sounds.                                *
  *****************************************
       ||                |
```


OK
NOT OK
1. Check for 28V from C/B (9). If OK change caption.
2. If AIR master warning fails to operate - Refer to 33-15-00.
C. Switch fans to "OFF". Check that both FLOW captions illuminate, the MI shows "OFF" and the FWD FLOW indicator reads zero. After 6 seconds, check GRND CALL horn sounds.
OK
NOT OK
MI shows cross hatch - Change contactor H1194(50)
FLOW caption light extinguished. Change pressure switch (48).
NOT OK
NOT OK
Pipe to pressure switch blocked - Rectify
Change MI (24).
D. Pull C/B (2), set FAN 1&3 switch (26) to "ON". Check that the FWD FLOW indicator reads 0.4 - 0.55 kg/s and that the MI shows "OFF"
OK
NOT OK
1. MI shows cross hatch - Change FAN 2 contactor (23).

```
        ||                     |2. FWD FLOW reading incorrect -  |
        ||                     |   Check air system as in Chart 107.|
        ||                     f3. FAN 3 does not run - Change fan. |
        ||                     ----------------------------------
        ||
***********************************
*With C/B 2 pulled, FAN 2 sw "ON"*
*and FAN 1&3 sw "ON", check that *
*the FWD FLOW indicated reads    *
*0.64 - 0.82 kg/s the MI shows   *
*"OFF" and the FLOW captions are *
*extinguished.                   *
***********************************
        ||        |
        ||        |     --------------------------------------
        OK      NOT OK---|1. MI shows cross hatch - Change    |
        ||               |   FAN 1 contactor (51).            |
        ||               |2. FWD FLOW reading correct but FLOW|
        ||               |   captions not extinguished - Check|
        ||               |   air system as in Chart 107.      |
        ||               |3. FWD FLOW reading incorrect and   |
        ||               |   FLOW captions not extinguished - |
        ||               |   Check air system as in Chart 107 |
        ||               |   - Check FAN 2 for damage.        |
        ||               --------------------------------------
        ||
***********************************
*Reset C/B (2). With all switches *
*"ON", check that all three fans  *
*are running and that the FWD FLOW*
*indicator reads 0.85 - 1.1 kg/s. *
***********************************
        ||        |
        ||        |     --------------------------------------
        OK      NOT OK---|If No.3 fan does not run, check ON |
        ||               |contact of switch (26),contact 4.  |
        ||               --------------------------------------
        ||
***********************************
*Put weight switch relays (63) and*
*(64) in the flight condition Ref.*
*32-61-00. Trip C/B (14) and set  *
*FAN 1&3 and FAN 2 switches to    *
*"AUTO". Check that all three     *
*fans running.                    *
***********************************
   ||                 |          ------------------------------
```


OK
NOT OK
Check for 115V at test points A15 and B15 on test module UT 1810.
OK
NOT OK
Change relay (59).
Check for earth on test point B15.
OK
NOT OK
Change C.B (13).
Change FWD VACUUM pump pressure regulator (61).
H.
Reset C/B (14) and trip C/B (13) and again check that fans are running.
OK
NOT OK
Check for 115V at test points A15 and B15 on test module UT1811.
OK
NOT OK
Change relay (60).
Check for earth on test point B15.
OK
NOT OK

```
    ||              ||                               |
    ||      ---------------------                    |
    ||      |Change C/B (14).   |                    |
    ||      ---------------------         ------------------------
    ||                                    |Change FWD VACUUM pump|
    ||                                    |pressure regulator    |
    ||                                    |(62).                 |
    ||                                    ------------------------
J.****************************************
  *Restore weight switch relays (63),(64) *
  *to ground condition Ref.32-61-00.      *
  *Reset C/B (13). Place FWD EMERGY RELIEF*
  *valve switch (31) to "SHUT". Move      *
  *switch to "OPEN" and check that MI (33)*
  *shows "OPEN".                          *
  ****************************************
            ||     |
            ||     |
            ||     |                   ----------------------------------
            ||     |                   |Magnetic indicator (33) fails to|
            ||   NOT OK--------|show appropriate legend -       |
            ||                         |Chart 108.                      |
            ||                         ----------------------------------
K.****************************************
  *Re-close EMERGY RELIEF valve,shut both *
  *FWD CABIN PRESSURE CONTROL DV's SYS 1  *
  *and SYS 2 and check that the FWD FLOW  *
  *indicator reads 0.72 - 0.88 Kg/s.      *
  ****************************************
            ||     |
            ||     |                   ----------------------------------
            OK   NOT OK--------|Check operation of outward NRV. *
            ||                         ----------------------------------
L.****************************************
  *Reset FWD DV switches to "NORM". Check *
  *that shelf static pressures are normal *
  *- Table 103, Figure 102.               *
  ****************************************
            ||     |
```

```
                 ||       |
                 OK    NOT OK--------|Check for leaks in ducting up-  |
                 ||                  |stream of fans, or individual   |
                 ||                  |branches/shelves as indicated by|
                 ||                  |static readings.                |
                 ||                   ---------------------------------
                 ||
M.******************************************
 *Pull C/B H1159 (H15 on panel 213), set *
 *EMERGY DEPRESS sw to "TEST", set SYS 1 *
 *AUTO selector control knob B to baro-  *
 *metric reading of the day, control knob*
 *R to mean position, control knob A to  *
 *-1600 feet and pressurize cabin in     *
 *flight mode with fans off and DV's con-*
 *trolling. Check that DV lift ratios are*
 *betweeen 4:1 and 5:1 and that all flow *
 *indications are normal (Flow 0.67 -    *
 *0.88 kg/s for air supply of 181 lb/min)*
 ******************************************
        ||                |
        OK                |      -----------
        ||             NOT OK-----|Chart 113|
    -----------                  -----------
    |System OK|
    -----------
```

5. Trouble Shooting (Rear Extraction)

Trouble Shooting (Rear Extraction)

A. Prepare to trouble shoot (Ref. para. 2) with LH and RH REAR EXTRACT fan switches (40) and (42) at "ON" (normal ground state), check that both MI's (46) and (47) show "ON" and that the FLOW caption light (39) is extinguished.

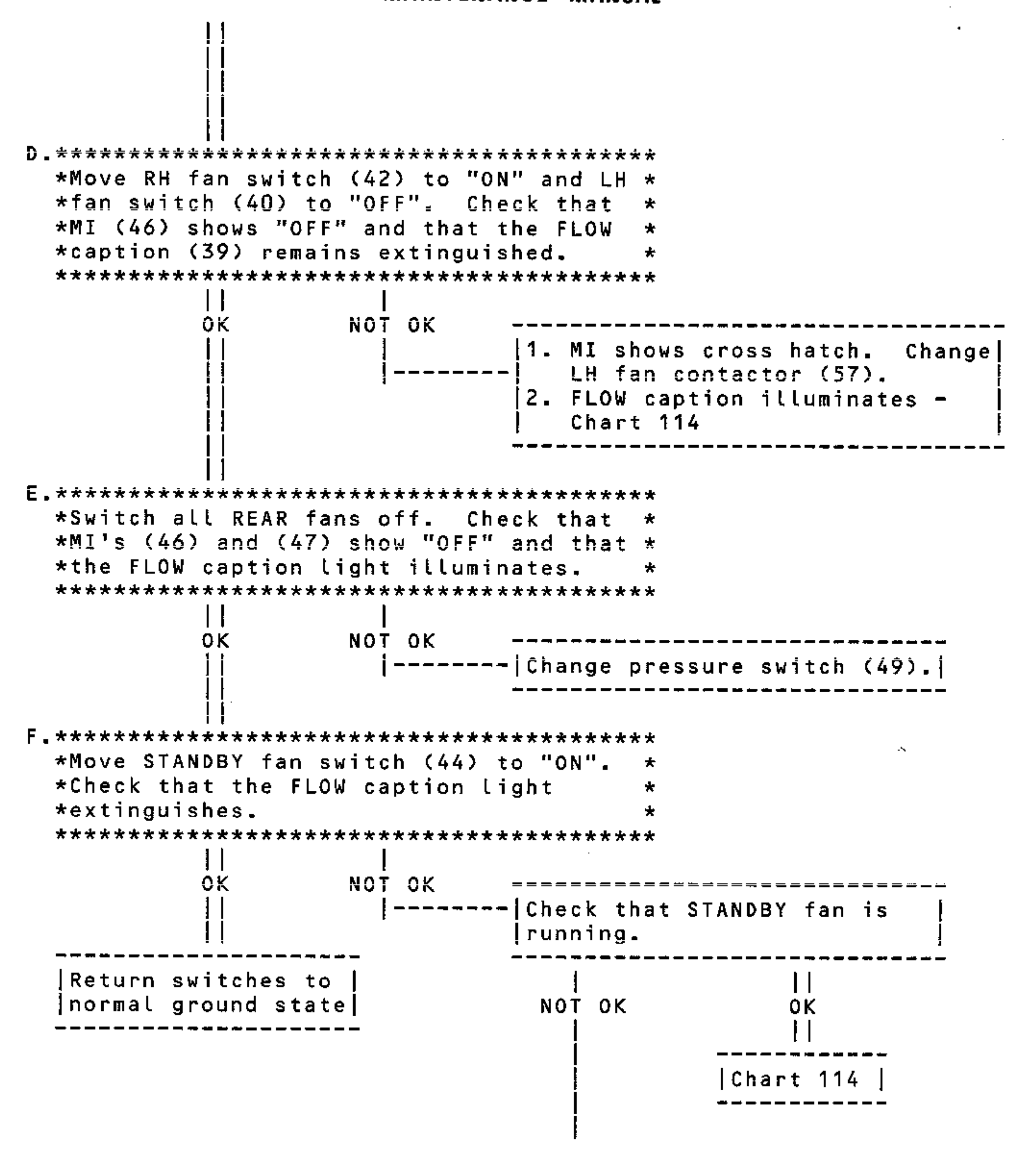
- OK → go to B.
- NOT OK:
  1. Both MI's indicate "ON" but FLOW caption light is illuminated -check pressure switch and sensing pipe, or manifold duct for major leakage.
  2. The MI shows "OFF" - Chart 111.
  3. One MI shows cross hatch - Chart 112.

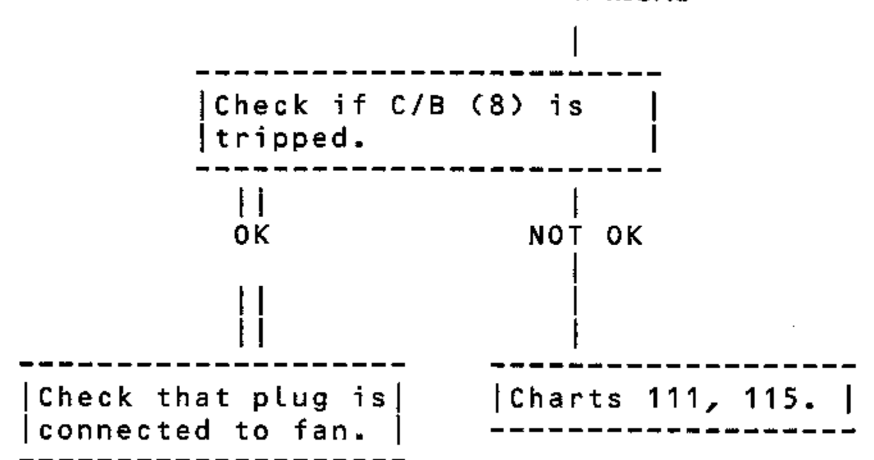
B. Press FLOW caption (39) and check that the light illuminates.

- OK → go to C.
- NOT OK: Change caption light.

C. Move RH fan switch (42) to "OFF". Check that the MI (47) shows "OFF" and that the FLOW caption (39) remains extinguished.

- OK → (continued)
- NOT OK:
  1. MI shows cross hatch. Change RH fan contactor (56).
  2. FLOW caption illuminates - Chart 114.


D. *Move RH fan switch (42) to "ON" and LH fan switch (40) to "OFF". Check that MI (46) shows "OFF" and that the FLOW caption (39) remains extinguished.
OK
NOT OK
1. MI shows cross hatch. Change LH fan contactor (57).
2. FLOW caption illuminates - Chart 114
E. *Switch all REAR fans off. Check that MI's (46) and (47) show "OFF" and that the FLOW caption light illuminates.
OK
NOT OK
Change pressure switch (49).
F. *Move STANDBY fan switch (44) to "ON". Check that the FLOW caption light extinguishes.
OK
NOT OK
Check that STANDBY fan is running.
Return switches to normal ground state
NOT OK
OK
Chart 114


Check if C/B (8) is tripped.
OK
NOT OK
Check that plug is connected to fan.
Charts 111, 115.

```
**********************************
*FWD EXTRACT MI READS "OFF",ALL *
*OTHER INDICATIONS              *
*NORMAL.  3 FANS RUNNING        *
**********************************
```

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
GROUND POWER SUPPLY	-
MULTIMETER	-
CIRCUIT BREAKER	
SAFETY CLIPS	-

Check	If NO
FWD SUPPLY and REAR EXTRACT indications normal.	Change C/B (9)
YES ↓ Check for earth at pin C of MI (24).	Change MI
YES ↓ Check for earth at terminal 1 of No.1 Fan contactor (51).	Change contactor (51) and check that MI reads 'ON'.
YES ↓ Check for earth at terminal 2 of No.2 Fan contactor (23).	Change contactor (23) and check that MI reads 'ON'.
YES ↓ Check for earth at terminal 2 of No.3 Fan contactor (50).	Change contactor (50) and check that MI reads 'ON'.

Chart 101

```
*********************************
*FWD FLOW INDICATOR READS HIGH *
*OR LOW, OTHER INDICATIONS     *
*NORMAL.                       *
*********************************
```

GROUND EQUIPMENT REQUIRED DESCRIPTION	PART NO.
GROUND POWER SUPPLY	-
MULTIMETER	-
CIRCUIT BREAKER SAFETY CLIPS	-

- FWD FLOW indicator reads zero.
  - YES: Check power supply is available from C/B(11).
    - YES: Change FWD FLOW indicator (18) and check reading normal.
      - NO: Change FWD FLOW indication amplifier (53)-check indicator normal
        - NO: Change FWD FLOW sensor (52).
  - NO: Flow below 0.45 kg/s,but not zero (no warning lts).
    - YES: Change FWD FLOW indicator (18) and check reading normal.
    - NO: Reading between 0.45 and 0.82kg/s
      - YES: Refer to chart 109.
    - NO: Reading above 1.1 kg/s.
      - YES: Change FWD FLOW indication amplifier (53)-check indicator normal
        - NO: Change FWD FLOW indicator (18)-check reading normal
          - NO: Change FWD FLOW sensor (52).

Chart 102

```
**********************************      ----------------------------
*ONE FLOW CAPTION ILLUMINATED,   *      |GROUND EQUIPMENT REQUIRED |
*OTHER INDICATIONS NORMAL.       *      |DESCRIPTION       PART NO.|
**********************************      ----------------------------
                                        |GROUND POWER SUPPLY    -  |
                                        |MANOMETER              -  |
                                        ----------------------------

-------------------       -------------------
|Check shelf stat-|-NO--|Check LH or RH    |
|ic pressures are |      |ducts leakage or |
|normal-Table 103,|      |blockage and     |
|Fig.102          |      |rectify          |
-------------------       -------------------
         |
        YES
         |
-------------------       -------------------
|Check pressure   |-NO--|Repair pipe.     |
|switch pipe      |      -------------------
|serviceable      |
-------------------
         |
        YES
         |
-------------------
|Renew pressure   |
|switch           |
-------------------
```

Chart 103

FWD FLOW INDICATOR READS 0.64 - 0.82 kg/s, MI READS "OFF". (ONE FAN NOT RUNNING).

GROUND EQUIPMENT REQUIRED DESCRIPTION	PART NO
GROUND POWER SUPPLY	
MULTIMETER	
CIRCUIT BREAKER	
SAFETY CLIPS	

Switch off FAN 2. Check that FWD FLOW indication drops to 0.4 - 0.55 kg/s.

- YES: Check if C/B H1182 (1) or C/B H1183 (2) is tripped.
  - NO: (continued)
  - YES: Remove the cable plug from the affected fan and reset the circuit breaker. Check that all three phases are live at the affected plug.
    - NO: Change the affected contacted.
    - YES: Change the affected fan.
- NO: Switch FAN 2 "ON" and check that the FWD FLOW reading increase to normal (0.85 - 1.1 kg/s.
  - YES: Check FAN 2 switch (25) and diode H2029.
  - NO: Check if C/B H2011 (3) is tripped.
    - YES: (continued)
    - NO: (continued)

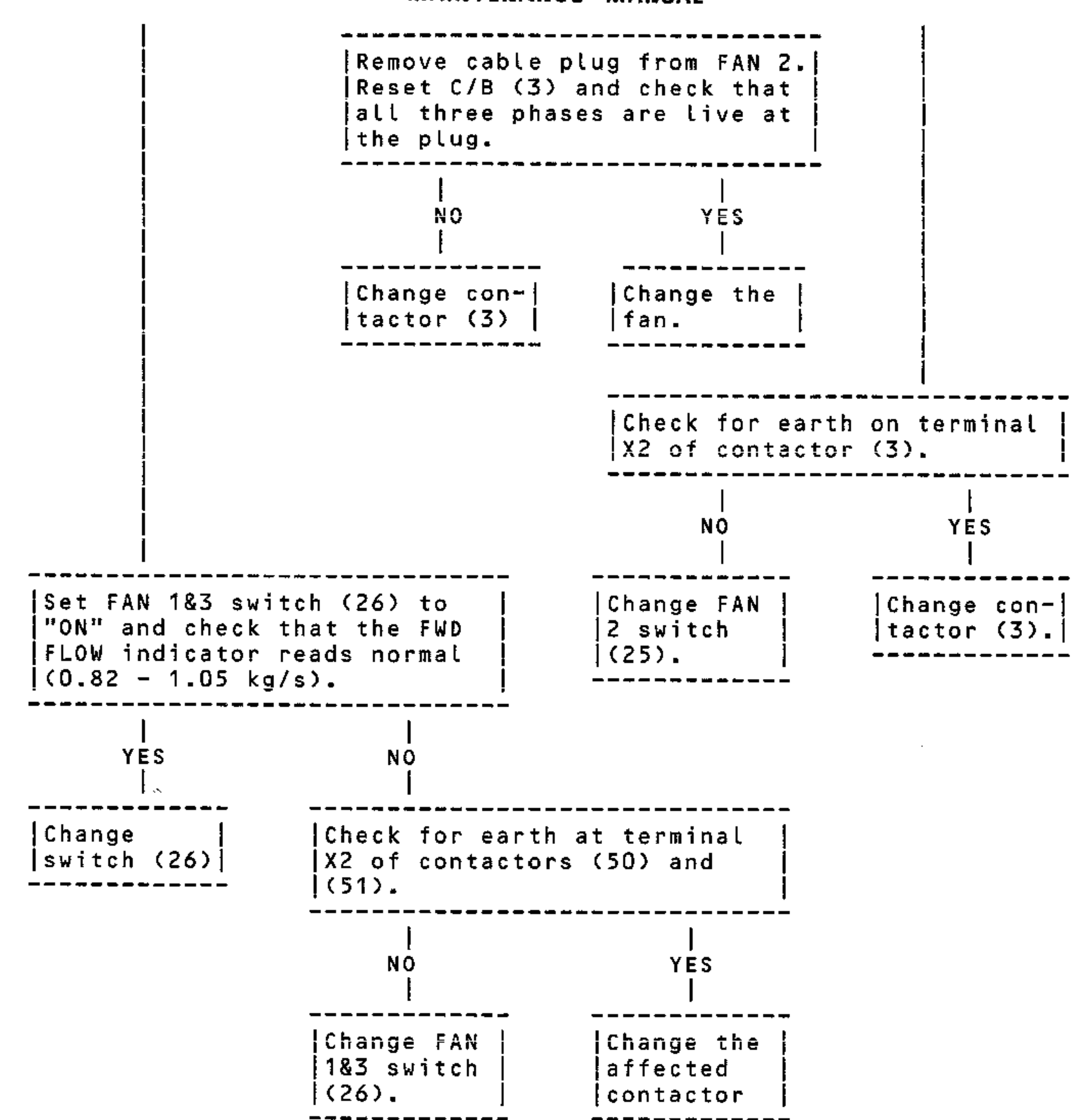

Remove cable plug from FAN 2. Reset C/B (3) and check that all three phases are live at the plug.
NO
YES
Change contactor (3)
Change the fan.
Check for earth on terminal X2 of contactor (3).
NO
YES
Change FAN 2 switch (25).
Change contactor (3).
Set FAN 1&3 switch (26) to "ON" and check that the FWD FLOW indicator reads normal (0.82 - 1.05 kg/s).
YES
NO
Change switch (26)
Check for earth at terminal X2 of contactors (50) and (51).
NO
YES
Change FAN 1&3 switch (26).
Change the affected contactor

Chart 104(a)

```
********************************
*MI INDICATES "OFF".FWD FLOW   *
*INDICATOR READS 0.4 - 0.55,   *
*FLOW captions may be          *
*ON OR OFF. (TWO FANS NOT      *
*RUNNING).                     *
********************************
```

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
GROUND POWER SUPPLY	
MULTIMETER	
CIRCUIT BREAKER	
SAFETY CLIPS	

```
 -------------------------------       -------------------------------
|Switch off FAN 2 and check if|       |FAN 2 is one of the two fans  |
|the FWD FLOW indication falls|-NO--  |not running. Check that       |
|to zero.                     |       |wiring downstream of diodes   |
 -------------------------------      |H2029 and H2030 is service-   |
              |                       |able.                         |
              |                        -------------------------------
             YES                           |                 |
              |                           YES                NO
 -------------------------------           |                 |
|FAN 1&3 are not running.      |       -----------      -----------
|Check that fan switch (26) is|       |Check for  |    |Rectify    |
|serviceable.                  |      |fan fault  |     -----------
 -------------------------------      |as in Chart|
       |                 |            |104(a).    |
      YES                NO            -----------
       |                 |
 -----------        -----------
|Check for  |      |Change     |
|fan fault  |      |switch (26)|
|as in Chart|       -----------
|104(a).    |
 -----------
```

Chart 104(b)

FWD EXTRACT MI SHOWS CROSS HATCH, ALL OTHER INDICATIONS NORMAL

GROUND EQUIPMENT REQUIRED DESCRIPTION	PART NO.
GROUND POWER SUPPLY	
MULTIMETER	
CIRCUIT BREAKER	
SAFETY CLIPS	

- Check if the RH FWD SUPPLY fan MI also shows cross hatch
  - YES: Check that C/B(9) is serviceable.
    - NO: Change C/B (9).
  - NO: Check for earth at terminal A of MI (24).
    - YES: Change MI (24).
    - NO: Check for earth at terminal 2 of FAN 3 contactor (50).
      - NO: Change contactor (50)
      - YES: Check for earth at terminal 2 of FAN 2 contactor (23).
        - NO: Change contactor (23)
        - YES: Check for earth on terminal 1 of contactor (51).
          - NO: Change contactor (51)

Chart 104(c)

****
*FWD EXTRACT MI SHOWS OFF,ALL *
*OTHER INDICATIONS NORMAL.   *
****

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
GROUND POWER SUPPLY	
MULTIMETER	
CIRCUIT BREAKER	
SAFETY CLIPS	

FWD EXTRACT MI (24) shows "OFF" when all other indications are normal.

YES

Change MI (24).

Chart 104(d)

```
**********************************
*BOTH FWD EXTRACT FLOW CAPTIONS *
*ILLUMINATED, MI SHOWING "ON",  *
*FWD FLOW INDICATOR READING     *
*BELOW 0.45 kg/s.               *
**********************************
```

GROUND EQUIPMENT REQUIRED DESCRIPTION	PART NO
GROUND POWER SUPPLY	-

```
----------------------------------        ----------------------------------
|Move FWD EMERGY RELIEF valve     |       |Check duct downstream of         |
|switch (31) to "OPEN" and        |-YES-  |fans for blockage and            |
|check MI (33) moves to "OPEN".   |       |rectify.                         |
|Check FLOW caption lights go     |       ----------------------------------
|out. (FWD FLOW indication will   |
|remain low).                     |
----------------------------------
                 |
                 NO
                 |
----------------------------------
|Check centre leg NRV and        |
|refit.                          |
----------------------------------
```

Chart 105

```
*********************************
*BOTH FWD EXTRACT FLOW CAPTIONS *
*ILLUMINATED,MI SHOWING OFF,    *
*FWD FLOW INDICATOR READING ZERO*
*********************************
```

GROUND EQUIPMENT REQUIRED DESCRIPTION	PART NO.
GROUND POWER SUPPLY	-
MULTIMETER	-
CIRCUIT BREAKER	
SAFETY CLIPS	-

```
-------------------------------         -------------------------------
|Check FAN 1&3  control switch|-NO--|Change control switch (26).  |
|(26) is operating correctly. |         -------------------------------
-------------------------------
              |
             YES
              |
-------------------------------
|Fault must be present in one |
|or two fans.Proceed in a     |
|manner similar to chart 104. |
-------------------------------
```

Chart 106

```
**********************************
*FWD FLOW CAPTION LIGHT(S) ON    *
*OR OFF, FAN 2 RUNNING           *
**********************************
```

GROUND EQUIPMENT REQUIRED DESCRIPTION	PART NO.
GROUND POWER SUPPLY	-
MULTIMETER	-
CIRCUIT BREAKER	-
SAFETY CLIPS	-
MANOMETER	-

```
-------------------
|FWD FLOW indicat-|
|or reads approx- |
|imately 0.55kg/s |
-------------------
        |
       YES
        |
-------------------       -------------------       -------------------
|Check shelf stat-|-YES-|Check pressure    |-YES-|Change pressure  |
|ic pressures     |     |switch pipe       |     |switch.          |
|normal - Table   |     |serviceable.      |     -------------------
|103, Figure 102. |     -------------------
-------------------              |
        |                        NO
        NO                       |
        |                -------------------
        |                |Repair pipe.      |
        |                -------------------
        |
        |                -------------------       -------------------
        |----------------|Check that FAN 2  |-NO--|Check FAN 2      |
        |                |is running        |     -------------------
        |                |correctly (feel   |
        |                |and aurally).     |
        |                -------------------
        |                        |
        |                       YES
        |                        |
```

Chart 107 (Sheet 1 of 2)

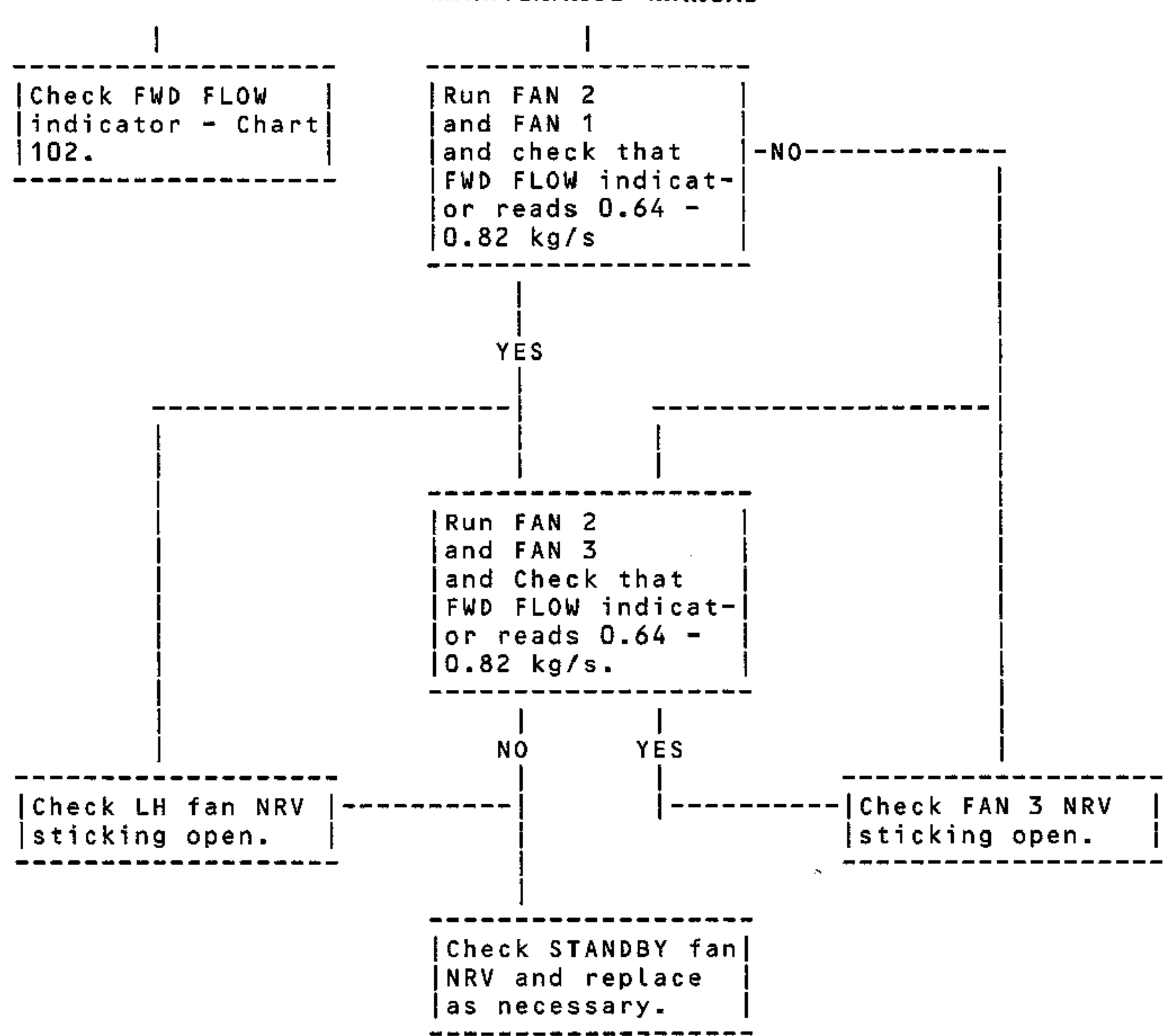


Chart 107 (Sheet 2 of 2)

```
********************************
*WITH SWITCHES AT NORMAL GROUND *
*STATE AND EMERGY RELIEF VALVE  *
*CONTROL SWITCH AT SHUT OR OPEN,*
*MI SHOWS INCORRECT INDICATION. *
********************************
```

GROUND EQUIPMENT REQUIRED DESCRIPTION	PART NO.
GROUND POWER SUPPLY	-
MULTIMETER	-
CIRCUIT BREAKER	
SAFETY CLIPS	-

```
---------------------------------        ---------------------------------
|At MI (33) check for 28V d.c.|-YES-|Check pin B of MI (33) for    |
|at pin A for "SHUT" and pin  |     |earth. If yes, change MI (33)|
|C for "OPEN".                |     ---------------------------------
---------------------------------
               |
               NO
               |
---------------------------------        ---------------------------------
|Check for 28V d.c.at terminal|-NO--|Check for 28V d.c.at C/B (12)|
|2 of control switch (31).    |     |If voltage not present,change|
---------------------------------   |C/B (12).                    |
               |                    ---------------------------------
              YES
               |
---------------------------------        ---------------------------------
|At control switch (31),check |-NO--|Change EMERGY RELIEF valve    |
|for 28V d.c.at terminal 3 for|     |control switch (31).         |
|"SHUT"and terminal 1 for"OPEN|     ---------------------------------
---------------------------------
               |
              YES
               |
---------------------------------        ---------------------------------
|At EMERGY RELIEF valve cable |-YES-|Change EMERGY RELIEF valve    |
|plug, check for 28V to earth |     ---------------------------------
|at pin C for"SHUT"and pin B  |
|for"OPEN"and earth potential |
|at pin A.                    |
---------------------------------
```

Chart 108

```
******************************          -------------------------------
*RACKED EQUIPMENT GENERALLY   *          |GROUND EQUIPMENT REQUIRED    |
*RUNNING HOT, LOW FWD FLOW,   *          |DESCRIPTION         PART NO. |
*FANS RUNNING, NO WARNING     *          -------------------------------
*LIGHTS.                      *          |GROUND POWER SUPPLY    -     (
******************************          -------------------------------

-------------------------------          -------------------------------
|Forward DV's SYS1,SYS2,open  |-NO--|Refer to 21-35-12            |
-------------------------------          -------------------------------
              |
             YES
              |
-------------------------------          -------------------------------
|FWD FLOW indicator reads 0.55|          |Check FAN 3 NRV (not stick-  |
|kg/s with FAN 1 only and     |-YES-|ing shut).                   |
|FAN 2 fan only.              |          -------------------------------
-------------------------------
              |
             NO
              |
-------------------------------          -------------------------------
|FWD FLOW indicator reads 0.55|          |Check FAN 1 NRV (not stick-  |
|kg/s with FAN 3 only and     |          |ing shut).                   |
|FAN 2 fan only.              |          -------------------------------
-------------------------------
              |
             NO
              |
-------------------------------          -------------------------------
|FWD FLOW indicator reads 0.55|          |Check FAN 2 NRV (not sticking|
|kg/s with FAN 1 and FAN 3    |-YES-|shut).                        |
|only.                        |
-------------------------------          -------------------------------
```

Chart 109 (Sheet 1 of 2)

```
                  |
------------------------------         ------------------------------
|Check that centre NRV is     |-NO--|Replace centre NRV.          |
|serviceable (not sticking    |      ------------------------------
|partially open).             |
------------------------------
                  |
                  |
                 YES
                  |
------------------------------         ------------------------------
|Check for leaks between fan  |-YES-|Rectify.                     |
|and flow sensor              |      ------------------------------
------------------------------
                  |
                  NO
                  |
------------------------------
|Check ducting for blockage   |
|downstream of fans           |
------------------------------
                  |
                 YES
                  |
------------------------------
|Rectify                      |
------------------------------
```

Chart 109 (Sheet 2 of 2)

```
*******************************
*WITH REAR EXTRACT CONTROL    *
*SWITCHES RH (42) AND LH (40) *
*PLACED"ON" IN TURN,THE ASSOC-*
*IATED MI's RH (47) and LH    *
*(46) FAIL TO DISPLAY "ON".   *
*******************************
```

GROUND EQUIPMENT REQUIRED DESCRIPTION	PART NO
GROUND POWER SUPPLY	-
MULTIMETER	-
CIRCUIT BREAKER	
SAFETY CLIPS	-

```
------------------                             -------------------
|With REAR fan    |                            |REAR fan MI RH    |
|control switch   |-------------YES------------|(47) or LH (46)   |
|RH (42) or LH    |                            |displays "ON".    |
|(40) at "ON",    |                            -------------------
|REAR FLOW caption|                                     |
|is extinguished. |                                     NO
------------------                                      |
        |                 -------------------    -------------------
        NO                |If terminal D2 of|    |Check for earth   |
        |                 |REAR fan contact-|    |potential at pin  |
        |                 |or RH (56) or LH |-NO-|A of MI RH (47)   |
        |                 |(57) is at earth |    |or LH (46).       |
        |                 |potential and    |    -------------------
        |                 |terminal D1 is   |             |
        |                 |not - change con-|             YES
        |                 |tactor (56) or   |             |
        |                 |(57).            |    -------------------
        |                 -------------------    |If 28V d.c. at    |
        |                                        |pin B of MI RH    |
        |                                        |(47) or LH (46) - |
        |                                        |change MI.        |
        |                                        -------------------
        |                                                 |
        |                                                 NO
        |                                                 |
        |                                        -------------------
        |                                        |Press FLOW capt-  |
        |                                        |ion to prove 28V  |
        |                                        |d.c. from C/B (9) |
        |                                        |or CB (10).       |
        |                                        |If no light -     |
        |                                        |change C/B (9) or |
        |                                        |(10).             |
        |                                        -------------------
        |
```

Chart 110 (Sheet 1 of 2)

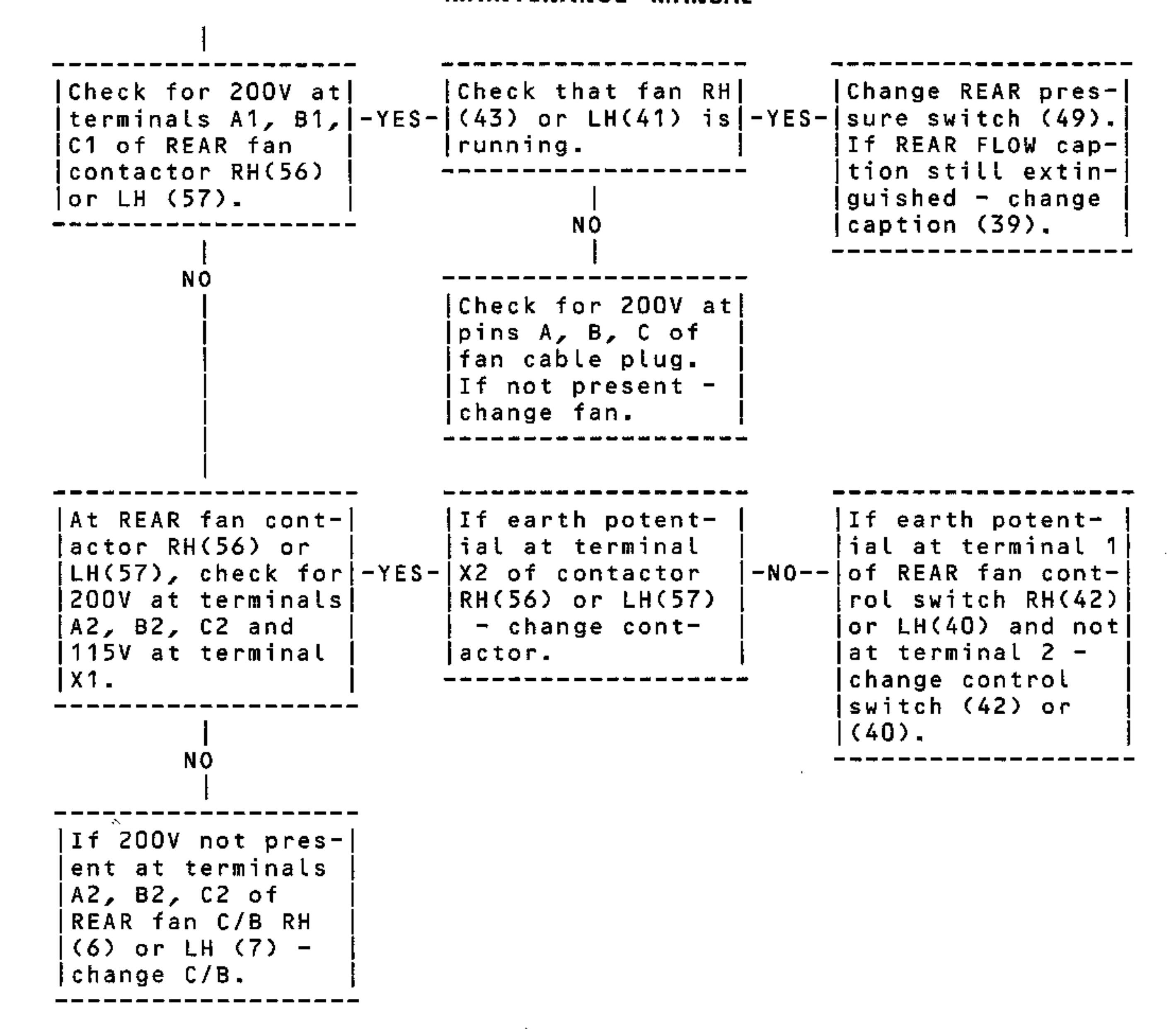


Chart 110 (Sheet 2 of 2)

WITH REAR FAN CONTROL SWITCHES AT NORMAL GROUND STATE AND RH AND LH FANS RUNNING, ONE MI SHOWS "OFF".

GROUND EQUIPMENT REQUIRED DESCRIPTION	PART NO
GROUND POWER SUPPLY	-
MULTIMETER	-
CIRCUIT BREAKER	
SAFETY CLIPS	-

Check if C/B (6) or (7) is tripped. —NO→ Check for 115V at test block UT 1810 or UT 1891 terminals A11 and B11 —NO→ Check that earth is present at terminal B11. —NO→ Check REAR fan control switch RH (40), (42).

Check for 115V at test block UT 1810 or UT 1891 terminals A11 and B11 —YES→ Change fan contactor RH(56) or LH(57).

Check that earth is present at terminal B11. —YES→ Change C/B (6) or (7).

Check if C/B (6) or (7) is tripped. → Remove cable plug from fan and check if C/B will reset. —NO→ Check wiring for short circuit. If none, change C/B.

Remove cable plug from fan and check if C/B will reset. —YES→ Check for voltage at cable plug with control switch on. —YES→ If voltage present on all three phases - change fan.

Check for voltage at cable plug with control switch on. —NO→ If voltage not present on all three phases - change fan contactor (56) and recheck voltage present. —NO→ Change C/B

Chart 111

```
******************************          ---------------------------------
*WITH REAR FAN CONTROL SWITCH-*        |GROUND EQUIPMENT REQUIRED       |
*ES AT NORMAL GROUND STATE AND*        |DESCRIPTION           PART NO   |
*RH AND LH FANS RUNNING, ONE  *         ---------------------------------
*MI SHOWS CROSS HATCH.        *        |GROUND POWER SUPPLY     -       |
******************************         |MULTIMETER              -       |
                                       |CIRCUIT BREAKER                 |
                                       |SAFETY CLIPS            -       |
                                        ---------------------------------

 ------------------------------          ---------------------------------
|Check if FWD SUPPLY fan MI    |-YES-|Change C/B (9) or (10).        |
|(37) shows cross hatch.       |       ---------------------------------
 ------------------------------
              |
              NO
              |
 ------------------------------          ---------------------------------
|Check for voltage at pins A   | YES |Change MI.                      |
|and B of affected MI.         |       ---------------------------------
 ------------------------------
              |
              NO
              |
 ------------------------------
|Change fan contactor (56)(59)|
 ------------------------------
```

Chart 112

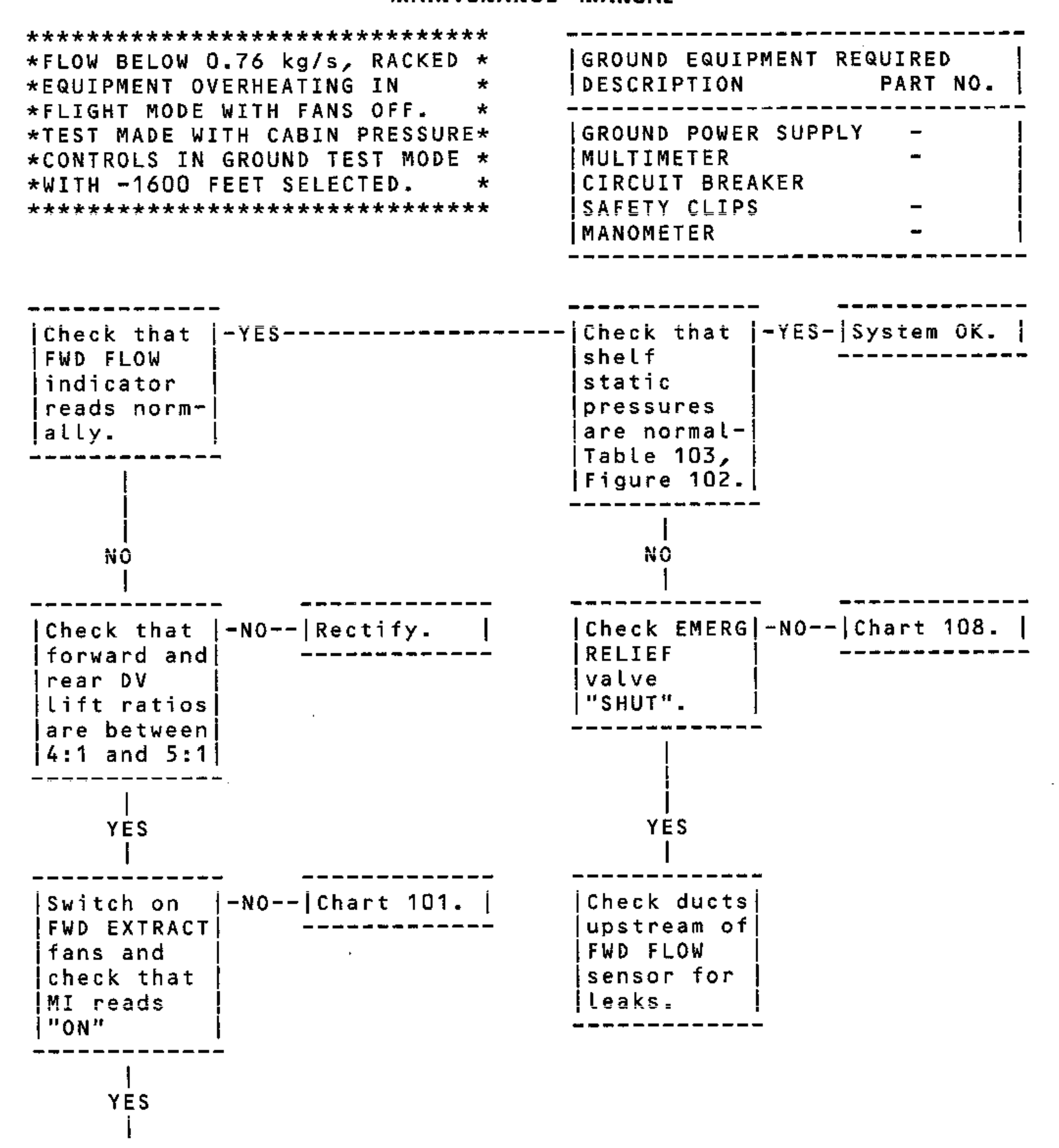


Chart 113 (Sheet 1 of 2)

```
        |
-------------------------------         -------------
|Recheck that the FWD FLOW     |-NO--|Chart 102. |
|indicator reads normally.     |         -------------
-------------------------------
        |
        |
       YES
        |
-------------------------------         -------------
|Check that the following are |-NO--|Rectify.   |
|serviceable -                 |         -------------
|1. Outward NRV.               |
|2. Inward NRV.                |
|3. Ducting downstream of FWD  |
|   FLOW sensor.               |
|4. DV plenum.                 |
-------------------------------
        |
       YES
        |
-------------------------------
|Check centre leg NRV.         |
-------------------------------
```

Chart 113 (Sheet 2 of 2)

```
********************************
*ONE REAR FAN RUNNING - FLOW   *
*CAPTION ILLUMINATED.          *
********************************
```

GROUND EQUIPMENT REQUIRED DESCRIPTION	PART NO
GROUND POWER SUPPLY	-

```
---------------------------------        ---------------------------------
|Check that filters are clean |-NO--|Change filters.                 |
|and serviceable.             |      ---------------------------------
---------------------------------
              |
             YES
              |
---------------------------------        ---------------------------------
|Check that NRV of running fan|-NO--|Rectify NRV.                    |
|is open by inspection through|      ---------------------------------
|orifice duct.                |
---------------------------------
              |
             YES
              |
---------------------------------        ---------------------------------
|Tape over outlets of station-|-NO--|Rectify NRV leakage.            |
|ary fans and all holes in    |      ---------------------------------
|orifice ducts except one.    |
|Check that there is no draw- |
|back through the remaining   |
|hole (NRV closed).           |
---------------------------------
              |
             YES
              |
---------------------------------        ---------------------------------
|Change pressure switch (49)  |-YES-| OK.                            |
|and check that FLOW caption  |      ---------------------------------
|is extinguished.             |
---------------------------------
              |
              NO
              |
---------------------------------        ---------------------------------
|Check pressure switch sensing|-YES-|Rectify or change               |
|pipe for leakage or blockage |     |sensing pipe.                   |
---------------------------------        ---------------------------------
              |
              NO
              |
```

Chart 114 (Sheet 1 of 2)

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```
                  |
                  |
-------------------------------           ------------------------------
|Check fan blades for damage. |-YES-|Change fan.                     |
-------------------------------           ------------------------------
                  |
                 NO
                  |
-------------------------------           -------------
|Check duct/NRV between fan   |-YES-|Rectify.    |
|and manifold for leakage or  |           -------------
|blockage.                    |
-------------------------------
                  |
                 NO
                  |
-------------------------------
|Check manifold and ducting   |
|upstream for leakage.        |
-------------------------------
                  |
                 YES
                  |
             ---------
             |Rectify|
             ---------
```

Chart 114 (Sheet 2 of 2)

```
******************************
*REAR RACKED EQUIPMENT RUNNING*
*HOT, FLOW LIGHT OFF, FANS    *
*RUNNING.                     *
******************************
```

GROUND EQUIPMENT REQUIRED DESCRIPTION	PART NO
GROUND POWER SUPPLY	-
MULTIMETER	-
CIRCUIT BREAKER	
SAFETY CLIPS	-
MANOMETER	-

```
---------------------------------         ----------------------------------
|Check static pressures normal|-YES=|Check racked equipment for       |
| - Table 104, Figure 103.     |         |obstructed cooling passages.     |
---------------------------------         ----------------------------------
        |
        NO
        |
-------------      -------------      -------------      -----------
|Shelf      |-NO--|Shelf      |-YES-|Check for  |=YES=|Rectify. |
|static     |     |static     |     |leaks on   |      -----------
|pressures  |     |depression |     |shelf and  |
|generally  |     |low at     |     |shelf coll-|
|low in rack|     |individual |     |ector duct |
-------------     |shelves.   |     |joint(s).  |
      |           -------------     -------------
      |                                   |
     YES                                  NO
      |                                   |
-------------      -------------      -------------
|Check      |-NO--|Check for  |     |Check for  |
|static     |     |blockage or|     |obstruction|
|depression |     |collapse of|     |on shelf or|
|low in     |     |ducting on |     |collector  |
|manifold.  |     |affected   |     |duct joints|
=============     |side(s).   |     -------------
      |           -------------
     YES
      |
---------------------------------     -----------
|Check for leak(s) in main     |-YES-|Rectify. |
|extract ducts.                |     -----------
---------------------------------
              |
              NO
              |
```

Chart 115 (Sheet 1 of 2)

```
                  |
                  |
------------------------------------     -----------
|Check operating fans for dam-|-NO--|Rectify. |
|aged blades and associated   |     -----------
|NRV's for correct function.  |
------------------------------------
                  |
                 YES
                  |
------------------------------------
|Check STANDBY fan NRV for    |
|failure to close fully.      |
------------------------------------
```

Chart 115 (Sheet 2 of 2)

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
(1) Circuit Breaker 200V		13-216	H1182	map ref G21	24-50-00	21-21-31
(2) Circuit Breaker 200V		14-215	H1183	map ref E2	24-50-00	21-21-31
(3) Circuit Breaker 200V		14-216	H2011	map ref D20	24-50-00	21-21-32
(4) Circuit Breaker 200V		14-216	2H1181	map ref A20	24-50-00	21-21-21
(5) Circuit Breaker 200V		13-215	1H1181	map ref A1	24-50-00	21-21-21
(6) Circuit Breaker 200V		14-216	2H1184	map ref B20	24-50-00	21-21-41
(7) Circuit Breaker 200V		13-215	1H1184	map ref C1	24-50-00	21-21-41
(8) Circuit Breaker 200V		2-213	H1185	map ref E17	24-50-00	21-21-41
(9) Circuit Breaker 28V		5-213	H1187	map ref C8	24-50-00	21-21-51
(10) Circuit Breaker 28V		5-213	H1186	map ref C9	24-50-00	21-21-51
(11) Circuit Breaker 28V		1-213	D201	map ref G10	24-50-00	21-21-11
(12) Circuit Breaker 28V		1-213	H1281	map ref G12	24-50-00	21-26-11
(13) Circuit Breaker 115V		2-213	H1123	map ref A16	24-50-00	21-35-41
(14) Circuit Breaker 115V		2-213	H1127	map ref G17	24-50-00	21-35-41
(15) Circuit Breaker 28V		16-215	H1216	map ref G3	24-50-00	21-21-71

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
(16)Circuit Breaker 28V		3-213	G294	map ref B9	24-50-00	32-61-64
(17)Circuit Breaker 28V		1-213	G292	map ref -	24-50-00	32-61-61
(18)FWD FLOW indicator		2-214	D204	AIR COND 3CM Panel	21-21-00	21-21-11
(19)FWD EXTRACT FLOW caption		2-214	H1209	Air cond 3CM Panel	21-21-00	21-21-51
(20)FWD EXTRACT RH No.3 fan		13-126	H1199	Above Fwd L/G Bay	21-21-19	21-21-31
(21)FWD EXTRACT LH No.1 fan		14-125	H1200	Above Fwd L/G Bay	21-21-19	21-21-31
(22)FWD EXTRACT No. 2 fan		14-126	H2013	Above Fwd L/G Bay	21-21-19	21-21-32
(23)FWD EXTRACT No. 2 fan contactor		23-123	H2012	Equip Bay	21-21-00	21-21-32
(24)FWD EXTRACT magnetic indicator		2-214	H1206	3CM Panel 3CM Panel	21-21-00	21-21-51
(25)FWD EXTRACT No.2 control switch		2-214	H1192	Air cond 3CM Panel	21-21-00	21-21-32
(26)FWD EXTRACT FAN 1&3 fans control switch		2-214	H1191	Air cond 3CM Panel	21-21-00	21-21-31
(27)FWD EXTRACT No.2 fail indication relay		8-123	H2014	Equip Bay	21-21-00	21-21-51
(31)EMERG RELIEF valve control switch		2-214	H1285	Air cond 3CM Panel	21-21-00	21-26-11

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
(32)EMERG RELIEF valve		126	H1286	Nosewheel Equip Bay	21-21-11	21-26-11
(33)EMERG RELIEF valve magnetic indicator		2-214	H1287	Air Cond. 3CM Panel	21-21-00	21-26-11
(34)FWD SUPPLY fans control switch		2-214	H1188	Air cond 3CM Panel	21-21-00	21-21-21
(35)FWD SUPPLY LH fan		123	1H1198	Equip Bay	21-21-22	21-21-21
(36)FWD SUPPLY RH fan		124	2H1198	Equip Bay	21-21-22	21-21-21
(37)FWD SUPPLY LH fan magnetic indicator		2-214	1H1205	Air Cond. 3CM Panel	21-21-00	21-21-51
(38)FWD SUPPLY RH fan magnetic indicator		2-214	2H1205	Air cond 3CM Panel	21-21-00	21-21-51
(39)REAR EXTRACT FLOW caption		2-214	H1210	Air Cond. 3CM Panel	21-21-00	21-21-51
(40)REAR EXTRACT LH fan control switch		2-214	1H1189	Air cond 3CM Panel	21-21-00	21-21-41
(41)REAR EXTRACT LH fan		167	1H1201	Rear Baggage Equip Bay	21-21-53	21-21-41
(42)REAR EXTRACT RH fan control switch		2-214	2H1189	Air Cond. 3CM Panel	21-21-00	21-21-41
(43)REAR EXTRACT RH fan		168	2H1201	Rear Baggage Equip Bay	21-21-53	21-21-41
(44)REAR EXTRACT STANDBY control switch		2-214	H1190	Air Cond. 3CM Panel	21-21-00	21-21-41

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
(45)REAR EXTRACT STANDBY fan		167	H1202	Rear Baggage Equip Bay	21-21-53	21-21-41
(46)REAR EXTRACT LH fan magnetic indicator		2-214	1H1208	Air Cond 3CM Panel	21-21-00	21-21-51
(47)REAR EXTRACT RH fan magnetic indicator		2-214	2H1208	Air cond 3CM Panel	21-21-00	21-21-51
(48)FWD EXTRACT depression switch		125	H1203	Nosewheel Equip Bay	21-21-21	21-21-51
(49)REAR EXTRACT depression switch		167	H1204	Rear Baggage Equip Bay	21-21-21	21-21-51
(50)FWD EXTRACT No.3 fan contactor		23-123	H1194	Equip Bay	21-21-00	21-21-31
(51)FWD EXTRACT No.1 fan contactor		21-123	H1195	Equip Bay	21-21-00	21-21-31
(52)FLOW sensor		126	D203	Nosewheel Equip Bay	21-21-26	21-21-11
(53)FLOW indication amplifier		9-216	D202	Racking aft of 3CM Panel	21-21-73	21-21-11
(54)FWD SUPPLY LH fan relay		14-123	1H1193	Equip Bay	21-21-00	21-21-21
(55)FWD SUPPLY RH fan relay		17-123	2H1193	Equip Bay	21-21-00	21-21-21
(56)REAR EXTRACT RH fan contactor		17-123	2H2020	Equip Bay	21-21-00	21-21-41
(57)REAR EXTRACT LH fan contactor		7-123	1H2020	Equip Bay	21-21-00	21-21-41

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
(58)REAR EXTRACT STANDBY fan contactor		7-123	H2021	Equip Bay	21-21-00	21-21-41
(59)FWD EXTRACT AUTO control relay RH		17-213	H1196	Equip Bay	21-21-00	21-21-31
(60)FWD EXTRACT AUTO control relay LH		14-213	H1197	3CM Panel	21-21-00	21-21-31
(61)FWD VACUUM pump and pressure switch (manual,system 2).		126	H1143	Nosewheel Equip Bay	21-21-00	21-35-41
(62)FWD VACUUM pump and pressure switch (auto,system 1)		125	H1141	Nosewheel Equip Bay	21-21-00	21-35-41
(63)U/C WEIGHT switch control relay, RH.		3-123	G313	Equip Bay	21-21-00	32-61-64
(64)U/C WEIGHT switch control relay LH		2-213	G301	3CM Panel	21-21-00	32-61-61

Component Identification
Table 101

IDENT NO.	STATIC PRESSURE in H2O	mm H2O	FLOW lb/min	kg/min
23	+0.85 to 1.54	21.6 to 39.0	14.0	6.35
29	-8.4	-213.4	24.2	10.97
34	-4.7	-119.4	10.5	4.76
42	0.8 to 1.15	20.4 to 29.2	18.9	8.57
43	-7.6 to -9.8	-193 to -248	26.5	12.02
50	-4.8	-122.0	13.0	5.90

NOTE: Static Pressures are given with 2 fans operating at Sea Level and 15°C conditions. For other conditions of atmospheric pressure P (psia) and temperature T (deg.C) factor by:

$$\frac{P}{14.7} \times \frac{288}{T+273}$$

Static Pressure Requirements - Forward Rack Supply Table 102

Ident No.	Static Pressure in H2O-ve/mm H2O-ve			Ident No.	Static Pressure in H2O-ve/mm H2O-ve		
	(1)	(2)	(3)		(1)	(2)	(3)
61	- -	0.23 7.1	- -	70	2.4 to 3.0 60.9 to 77.5	1.5 to 1.8 to36.8 45.7	 1.67 to42.6
62	3.24 82.0	2.23 56.64	- -	71	2.8 to 3.5 71.1 88.9	1.7 to 1.8 to43.2 45.0	 1.87 to48.0
63	3.71 94.5	2.60 66.04	- -	72	2.90 73.5	2.03 51.62	1.90 48.3
65	1.85 to 2.3 47.0 to 58.5	1.3 to 1.6 33.02 to 40.64	-	73	3.02 77.0	2.12 53.85	1.98 50.4
66	1.0 to 1.25 25.4 to 31.8	0.7 to 0.89 17.78 22.61		74	3.02 77.0	2.12 53.85	1.98 50.4
67	3.90 99.0	2.73 69.34	- -	75	2.92 73.5	2.04 51.81	1.91 46.9
68	2.3 to 2.8 58.0 to 71.1	1.6 to 1.9 40.6 49.8	1.5 to 1.8 to38.0 48.3	76	2.94 75.0	2.06 52.32	1.93 49.0
69	2.3 to 2.9 58.0 to 73.5	1.6 to 2.0 40.6 51.31	1.5 to 1.8 to38.0 to 48.3	78	2.8 to 3.6 71.12to 91.44	1.96 to 2.52 49.8 64.0	 1.98 to50.4

EFFECTIVITY: ALL

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Ident No.	Static Pressure in H2O-ve/mm H2O-ve		
	(1)	(2)	(3)
80	- -	- -	- -
82	6.10 155.0	3.90 99.06	- -
85	8.0 204.0	5.00 127.0	- -
86	+2.90 +73.5	- -	- -
87	+3.0 +77.5	+18.6 +47.5	- -
90	4.1 104.0	2.65 69.31	- -
93	2.83 72.0	1.98 50.29	1.86 47.2
95	3.07 78.0	1.9 48.5	2.02 52.0
104	3.43 87.0	2.40 60.96	-

Ident No.	Static Pressure in H2O-ve/mm H2O-ve		
	(1)	(2)	(3)
96	2.56 65.8	1.8 85.72	1.78 43.0
97	2.57 65.28	1.81 45.97	1.80 96.2
98	2.5 to 2.9 63.5 73.66	1.75 to 2.03 to44.45 51.56	 1.73 to44.2
99	2.60 67.5	1.86 47.24	1.73 44.2
100	1.9 to 2.4 48.3 61.0	1.2 to 1.5 to29.2 36.8	 1.34 to35.4
101	1.6 to 2.3 42.0 59.8	1.2 to 1.6 to29.5 41.9	1.0 to 1.5 to27.5 to 39.2
102	2.05 51.0	1.44 36.57	1.34 33.4
103	2.12 54.0	1.48 37.59	1.39 35.4
109	0.2 to 0.41 5.08 to	- -	- -

Ident No.	Static Pressure in H20-ve/mm H20-ve			Ident No.	Static Pressure in H20-ve/mm H20-ve		
	(1)	(2)	(3)		(1)	(2)	(3)
					10.14		
105	1.06 26.92	- -	- -	110	1.33 35.8	0.93 23.62	 -
108	2.2 56.0	1.33 34.8	- -				

NOTES

1) The above statics are given at Sea Level and 15 deg C conditions. For other conditions of atmospheric pressure P (psia) and temperature T(deg C) factor by:
For columns (1), (2) -

$$\frac{P}{14.7} \times \frac{288}{T+273}$$

For column (3) -

$$\frac{14.7}{P} \times \frac{T+273}{288}$$

2) Statics in column (1) are quoted for three Fwd Rack Extract Fan operating with both forward discharge valves open.

3) Statics in column (2) are quoted for three Fwd Rack Extract Fans operating with both fwd discharge valves closed.

4) Statics in column (3) are quoted for 0.875 kg/sec extract via fwd discharge valves with fans inoperative. For other values of flow W, factor by:

$$\left(\frac{W}{0.875}\right)^2$$

Static Pressure Requirements - Forward Rack Extraction Table 103

IDENT No.	Static Pressure in H2O-ve/mm H2O-ve Col. 1 2-Fans, Normal	Col.2 Stand-by Fan
110	5.0 127.0	1.99 50.54
111	3.6 91.4	1.35 34.29
113	3.5 88.9	1.10 27.94
114	3.5 to 4.2 88.9 to 106.7	1.42 36.07
115	7.1 180.3	2.72 69.09
117	11.5 292.1	3.74 95.0
119	8.0 203.2	- -
120	4.3 109.2	1.71 43.43
121	3.0 to 3.7 76.2 to 94.0	1.26 to 1.56 32.0 to 39.62
122	6.0 152.4	2.35 59.69
123	4.5	1.73

R R

IDENT No.	Static Pressure in H20-ve/mm H20-ve Col. 1 2-Fans, Normal	Col.2 Stand-by Fan
	114.3	43.94
124	5.6 142.2	2.27 57.66
125	10.0 254.0	4.3 109.22

NOTES

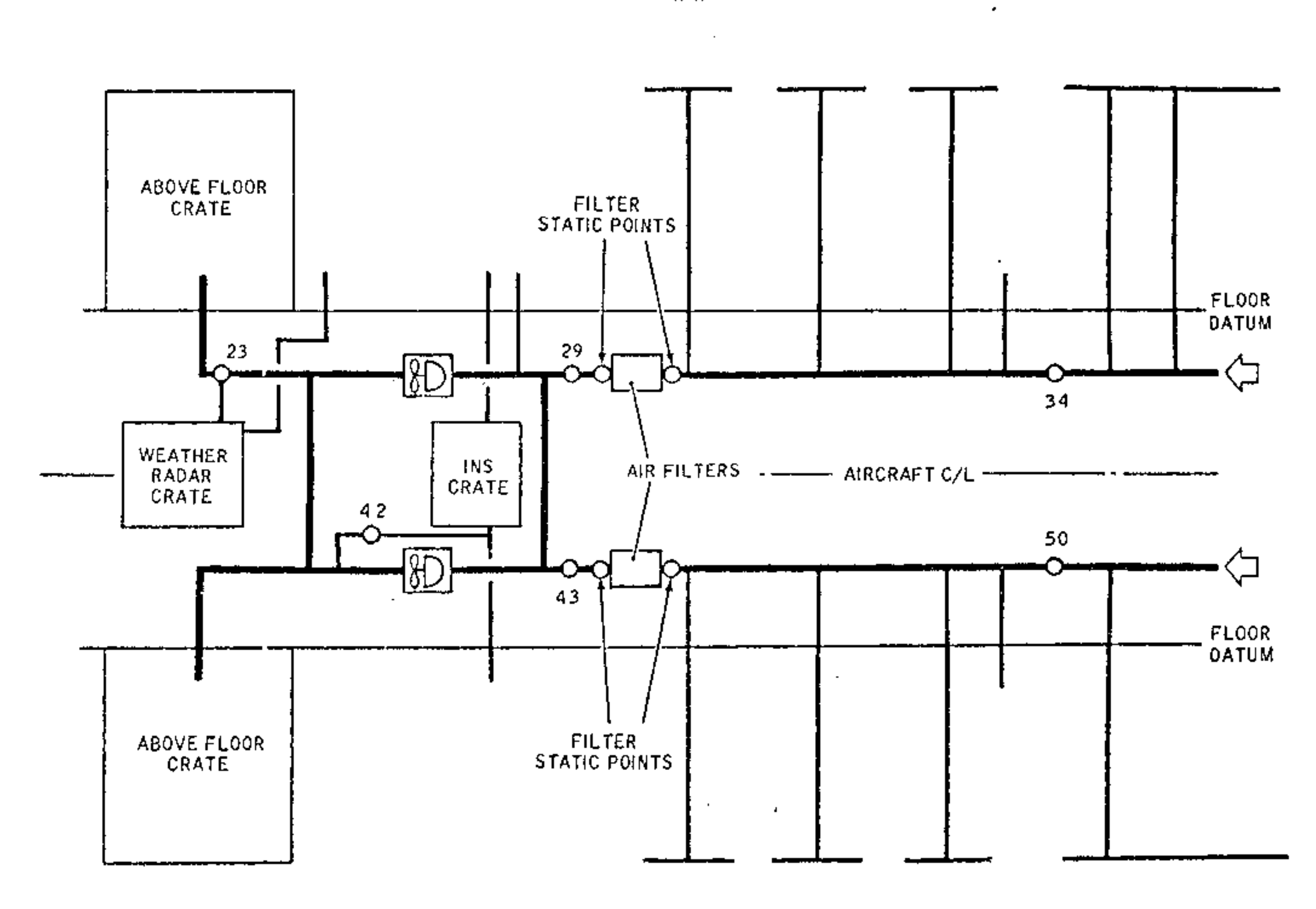
1) The above statics are given at Sea Level and 15 deg C conditions. For other conditions of atmospheric pressure P (psia) and temperature T (deg.C) factor by:

$$\frac{P}{14.7} \quad x \quad \frac{288}{T+273}$$

2) Statics in column (1) are quoted for two normal rear rack extract fans operating with HF boxes fitted but not powered.

5) Statics in column (2) are quoted for Standby Fan only.

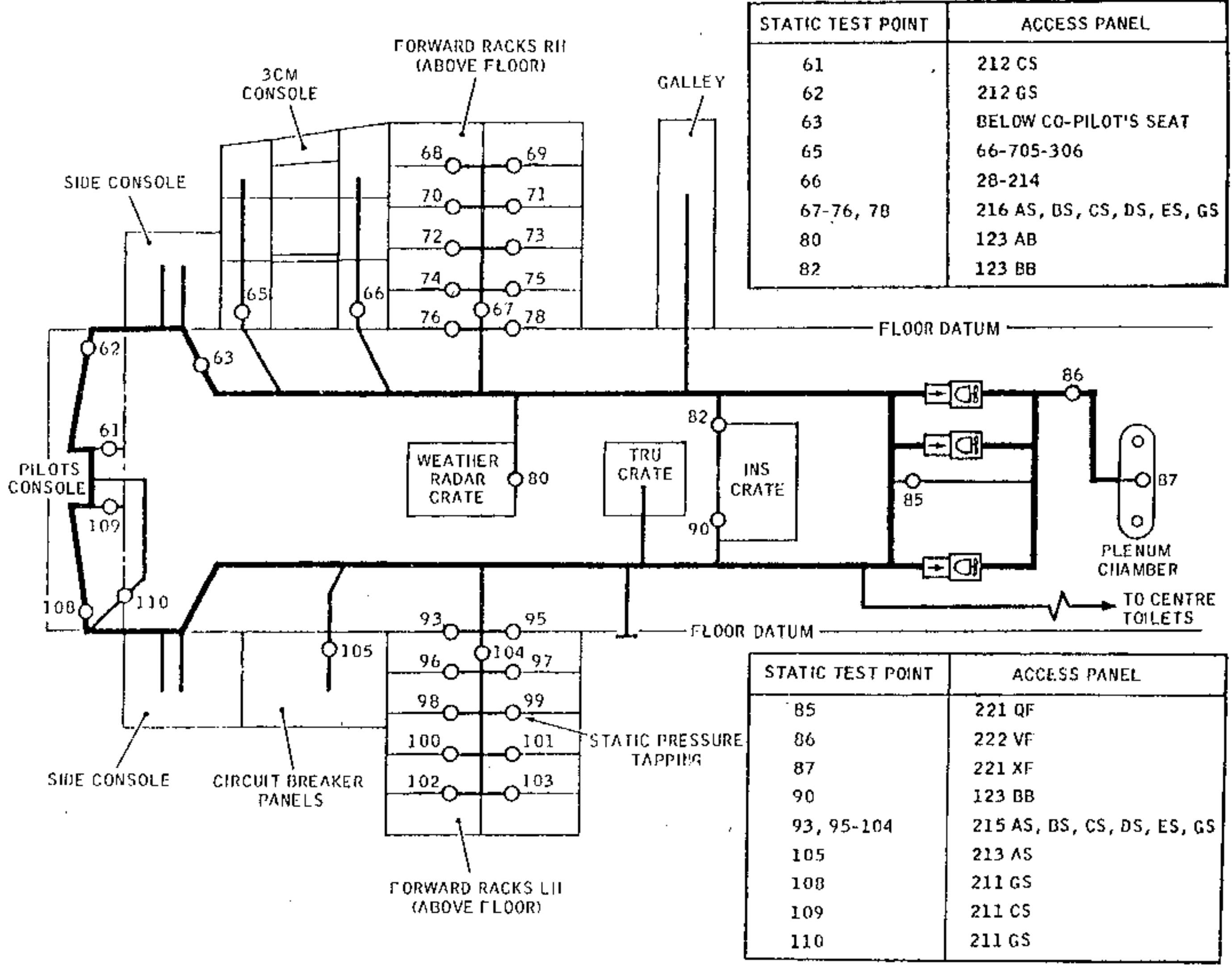
Static Pressure Requirements - Rear Rack Extraction Table 104



Static Test Points - Forward Rack Supply
Figure 101

CMB 21 21 00 1 BAMO

C8 07627/000



STATIC TEST POINT	ACCESS PANEL
61	212 CS
62	212 GS
63	BELOW CO-PILOT'S SEAT
65	66-705-306
66	28-214
67-76, 78	216 AS, BS, CS, DS, ES, GS
80	123 AB
82	123 BB

STATIC TEST POINT	ACCESS PANEL
85	221 QF
86	222 VF
87	221 XF
90	123 BB
93, 95-104	215 AS, BS, CS, DS, ES, GS
105	213 AS
108	211 GS
109	211 CS
110	211 GS

Static Test Points - Forward Extraction System
Figure 102

R

EFFECTIVITY: ALL

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CB 07628/00B

REAR RACKS RH (ABOVE FLOOR)
110
111
112
113
114
115
STATIC PRESSURE TAPPING
117
REAR BAGGAGE HOLD EXTRACT
119
125
120
121
REAR RACKS LH (ABOVE FLOOR)
122
123
124
GALLEY EXTRACT
OVEN

CMB 21 21 00 1 CAM0

Test Point	Access	Test Point	Access
110	On shelf 01-244	119	On shelf 06-243
111	On shelf 02-244	120	On shelf 05-243
112	On shelf 03-244	121	On shelf 04-243
113	On shelf 04-244	122	On shelf 03-243
114	On shelf 05-244	123	On shelf 02-243
115	On shelf 06-244	124	On shelf 01-243
117	Panel 243-DF	125	On shelf 06-243

Static Test Points - Rear Extraction System
Figure 103

AIR EXTRACTION - SERVICING

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS IN 24-00-00

1. General

When any air cooled racked equipment is removed with the extraction fans running, more air will be drawn through the exposed metering plate in the shelf and less through the remaining equipment. If this condition is allowed to continue for long periods, some equipment may overheat and cause premature failure. Blanks must be placed over the metering plates when equipment is removed. At all times when electrical power is connected to the aircraft and electrical/electronic systems are operating, the following precautions must be observed.

2. Operating Conditions

A. General

(1) When electrical power is connected to the aircraft, ensure that the equipment bay cooling systems are operating.

(2) Check that there is a sufficient cooling airflow through the racks by ensuring that, where equipment has been removed, the associated airflow metering plates on the shelves have been fitted with appropriate blanks, where required (Ref.para.2B and 3)

R (3) If the flight compartment ambient air temperature is above 25 deg C (77 deg F) for a period exceeding 45 minutes, provide for one of the following further requirements:

(a) A fresh air supply from a ground air conditioning truck connected to the ground air conditioning connection to the rear of the main landing gear bay. (Ref.12-14-21).

(b) A fresh air supply from an HP air start truck connected to an air start connection, one below each engine.

(c) A supply of engine bleed air through the air generation system.

(d) Isolation of the critical flight compartment panel instruments by tripping the following

Instrument Ground Disconnect (IDG) master circuit breakers with white surrounds (Ref.24-41-00):

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
ENG INST, BUS 5XS	2-213	X351	H4
ENG INST, BUS 6XS	2-213	X352	H3
FLT CONT & NAV BUS 14XS	2-213	X355	H2
ENG INST, BUS 7XS	4-213	X353	G2
ENG INST, BUS 8XS	4-213	X354	G3
ENG 2 FUEL INST, BUS 2XS	13-215	X342	G1
ENG & FUEL INST, BUS 3XS	13-216	X343	G3
NAV INST, BUS 13XS	13-216	X345	G4
ENG & FUEL INST, BUS 1XS	14-215	X341	G2
ENG 1 FUEL INST, BUS 4XS	14-216	X344	F1

B. Metering Plate Requirement (ARINC Cooled Equipment)

NOTE: If the electronic rack systems are to be operated with ARINC (Air Radio Inc. Agreement) cooled equipment removed from shelves, the following precautions must be observed to ensure satisfactory cooling.

(1) Do not remove air flow metering plates from the shelves without fitting a blank or appropriate restriction. Failure to observe this precaution will result in excessive air leakage to the detriment of other equipment in the racks, especially on the same shelf.

(2) When an equipment (box) is removed, the corresponding metering plate must be blanked, or appropriately restricted. The table below lists boxes where the metering plates do not require blanking because the airflow requirement is low and/or the pressure

drop through the box is low.

R

ITEM NO.	DESCRIPTION
Forward Racks Above Floor *	
1,2,3) 5 to 8) 36 to 43,) 47 to 50,) 76,82,83,) 84)	Elfin Cases
45	Fuel Level Switching Pack
46	Fuel Main CG Pack
50,51	FDAU
R 60	Passenger Address Amplifier
61	Interphone Amplifier
R 10,62	Transceiver VHF
R 27,63	Receiver VOR
67	Radio Nav FDSU
R 70	R Flight Control Static monitoring R change over Unit
R 28,71	Flight Control Comparator
75	Fuel Standby CG Packs
34,35) 80,81)	AICS Sensor Units
R 31	Anti-Skid Control Unit
R 32	Brake Overload Control Unit
R 33	Nosewheel Steering Electronic Unit
Rear Racks **	
R 1,2	Receiver ADF

R

ITEM NO.	DESCRIPTION
Underfloor Racks ***	
R 1	Inertial Navigational Unit

* (Ref. Fig. 301)
** (Ref. Fig. 302)
*** (Ref. Fig. 303)

(3) Metering plates must be restored to the normal configuration before refitting boxes.

C. Static Pressure Testing

(1) When checks of air flows and static pressures are to be carried out with electronic boxes not fitted, the appropriate metering plates(s) must be partially blanked to give accurate compensation for the pressure drop of the missing equipment. The numbers of metering plate holes to be blanked for pressure drop compensation are given in Tables 301, 302 and 303.

ITEM	SHELF	DESCRIPTION	METERING PLATE No.OF 0.125 in Dia (3.175 mm) HOLES	METERING PLATE No.OF HOLES TO BE BLANKED	CHAP. REF.
1,2 3	1-215	Misc.Elfin Cases (3 metering plates)	4,7,6	0	25-71-00
4	2-215	FC Static Inverter	41	2	27-15-00
5,6		Misc.Elfin Cases	4,9,	0	25-71-00
7,8		(4 metering plates)	5,3	0	
9	3-215	ACS Electronic Unit	103	18	-
10		VHF1	11	1	23-21-00
11		Radio Nav.Computer 1	103	18	-
12		Radio Nav.Computer (SP)	51	9	-
13	4-215	Auto Throttle	28	4	22-31-00
14		Electrical Trim Computer	47	12	22-33-00
15		Landing Display			

	ITEM	SHELF	DESCRIPTION	METERING PLATE No.OF 0.125 in Dia (3.175 mm) HOLES	No.OF HOLES TO BE BLANKED	CHAP. REF.
			Computer	22	7	22-41-00
R	16		ITEM Computer No.1	61	21	22-42-00
R	17		Azimuth Computer No 1	90	41	22-13-00
R	18		Pitch Computer No 1	1 x 2.25 (57 mm)	*	22-12-00
R	19	5-215	Amplifier - Passenger	11	2	23-32-00
R			Entertainment			
R	20		Tape Reproducer -	8	1	23-32-00
R			Passenger Entertainment			
	21		CAS (SP)	15	0	-
	22		CAS (SP)	28	0	-
R	23	6-215	Air Data Computer No.1	19	4	34-11-00
R	24		SFC Unit No 1	24	3	27-39-00
R	25	7-215	Interrogator DME 1	67	32	34-51-00
R	26		Interrogator DME 2	67	32	34-51-00
R	27		Receiver VOR 1	18	5	34-55-00
R	28	8-215	FC Comparator (Green)	6	1	27-17-00
R						27-27-00
R						27-37-00
R	29		Auto Stab Computer	66	16	22-22-00
R			No.1			
	30		Data Link (SP)	43	0	-
R	31	9-215	Anti-Skid and Control	6	1	32-43-00
R			Unit			
R						
R	32		Brake Overload Control	8	4	32-43-00
	33	10-215	Nosewheel Steering	4	1	32-51-00
R			Electronic Unit			
	34		AICS Sensor Unit	13	3	71-61-00
	35		AICS Sensor Unit	13	3	71-61-00
	36,		Misc. Elfin Cases	8,8,	0	25-71-00
	37,		(4 Metering plates)	8,6	0	
	38,					
	39					
	40,	1-216	Misc. Elfin Cases	14,7,	0	25-71-00
	41,		(4 Metering plates)	7,l6	0	

	ITEM	SHELF	DESCRIPTION	METERING PLATE No.OF 0.125 in Dia (3.175 mm) HOLES	METERING PLATE No.OF HOLES TO BE BLANKED	CHAP. REF.
	42, 43					
	44	2-216	FC Static Inverter	31	2	27-15-00
R						27-25-00
R						27-35-00
	45		Fuel Level Switching Pack	15	1	28-42-00
	46		Fuel Main CG Pack	12	2	28-44-00
	47, 48		Misc. Elfin Cases	3,4,	0	25-71-00
	49, 50		(4 metering plates)	8,3	0	
	50	3-216	FDAU No1	13	1	31-31-00
	51		FDAU No2	13	1	31-31-00
	52		AIDS (SP)	0	0	-
	53		Logic Unit	13	1	31-31-00
R	54	4-216	Pitch Computer No.2	1 x 2.25 in (57 mm)	*	22-12-00
R	55		Azimuth Computer No.2	54	14	22-13-00
R	56		Auto Throttle Comp No.2	23	4	22-31-00
R	57		Electric Trim	34	8	22-33-00
R			Computer No.2			
R	58		Warning & Landing	20	5	22-41-00
R			Display			
R			Computer No.2			
R	59		ITEM Computer No.2	48	8	22-42-00
R						
R	60	5-216	Amplifier = Passenger	10	0	23-31-00
R			Address			
R	61		Interphone Amplifier	1 x 0.25 in (6.3 mm)	0	23-41-00
R						
R	62		Transceiver VHF 2	9	0	23-21-00
R	63		Receiver VOR 2	16	1	34-55-00
R						
R	64	6-216	Air Data Computer No. 2	22	7	34-11-00
R	65		HUD (SP)	12	0	-
R	66		SFC	21	4	27-39-00
R						
R	67	7-216	RNAV FDSU	4	0	-
R	68		RNAV Computer 2	85	0	-

	ITEM	SHELF	DESCRIPTION	METERING PLATE No.OF 0.125 in Dia (3.175 mm) HOLES	METERING PLATE No.OF HOLES TO BE BLANKED	CHAP. REF.
R R	69		RNAV (SP)	42	0	-
R R R	70	8-216	FC Static monitoring change over unit	5	0	27-17-00 27-27-00 27-37-00
R R R	71		FC Comparator (Blue)	6	2	27-17-00 27-27-00 27-37-00
R	72		Auto Stab Computer No.2	64	16	22-22-00
	73	9-216	AICS Test Unit	28	3	71-61-00
	74		Fuel Quantity Pack	6x0.25in (6.3mm)	1x0.25m (6.3mm)	28-44-00
	75		Fuel Standby CG Pack	11	1	28-44-00
	76		Misc. Elfin Cases (1 metering plate)	8	0	25-71-00
	77	10-216	Fuel Quantity Pack	6x0.25in (6.3mm)	1x0.25m (6.3mm)	
	78		Fuel Level Switching Pack	12	12	28-42-60
	79		Fuel Standby CG Pack	11	1	28-44-00
	80		AICS Sensor Unit	13	3	71-61-00
	81		AICS Sensor Unit	13	3	71-61-00
	82, 83, 84		Misc. Elfin Cases (3 metering plates)	6,2,3	0	25-71-00

Table 301

NOTE: 1. For items marked * cover the 2 1/4 (57 mm) in dia.hole with a plate having 3 x 1/2 in (12.7 mm) holes.

2. SP indicates space provision.

3. Forward Rack Equipment - Holes To Be Blanked When Equipment Not Fitted (Ref. Fig. 301)

	ITEM	SHELF	DESCRIPTION	METERING PLATE No.OF 0.125 in Dia (3.175 mm) HOLES	METERING PLATE No.OF HOLES TO BE BLANKED	CHAP. REF.
R	1	1.244	Receiver ADF 1	12	2	34-53-00
R	2		Receiver ADF 2	12	2	34-53-00
R	3	2.244	Transceiver HF 2	10 x 1 in (25.4 mm)	5 x 1 in (25.4 mm)	23-11-00
R	4	2.243	Transceiver HF 1	10 x 1 in (25.4 mm)	5 x 1 in (25.4 mm)	23-11-00
	5	4.244	AICU			71-61-00
	6		AICU			71-61-00
	7	4.243	AICU	)	)	71-61-00
	8		AICU	)	)	71-61-00
				Each box max.free		
	9		AICU	)area	)	71-61-00
	10		AICU	)	)	71-61-00
	11	5.243	AICU	)	)	71-61-00
	12		AICU	)	)	71-61-00

Table 302

NOTE: Rear Rack Equipment - Holes to Be Blanked When Equipment Not Fitted (Ref. Fig. 302)

	ITEM	SHELF	DESCRIPTION	METERING PLATE No.OF 0.125 in Dia (3.175 mm) HOLES	No.OF HOLES TO BE BLANKED	CHAP. REF.
R	1	26.123	Inertial Data	19	1	34-46-00
R			Comparator			
R	2	27.123	Inertial Navigation	)Each box	Each box	34-45-00
R			Unit No. 1	)9x0.5in	ALL 0.5in)	
R	3		Inertial Navigation	)		
R			Unit No. 2	)9x2in	8x2in)	34-45-00
R	4		Inertial Navigation	)		
R			Unit No. 3	)(50.8mm)	(50.8mm)	34-45-00

Table 303

NOTE: Underfloor Rack Equipment - Holes To Be Blanked When Equipment Not Fitted (Ref. Fig. 303)

3. Manufacturing of Blanks

NOTE: A range of blanks can be made from any suitable material such as plywood or plastic laminate. The blanks must be substantial enough to lightly compress the seal round the metering plate and must have an interference block to prevent equipment from being installed with a blank fitted. The following sizes of blank are suggested.

EQUIPMENT SIZE		1/4 ATR	3/8 ATR	1/2 ATR	3/4 ATR	1 ATR
WIDTH	mm	57	90	123	190	256
	ins	2.25	3.55	4.85	7.50	10.10
LENGTH,	mm	311	311	311	-	-
SHORT	ins	12.25	12.25	12.25	-	-

EQUIPMENT SIZE		1/4 ATR	3/8 ATR	1/2 ATR	3/4 ATR	1 ATR
LENGTH, LONG	mm	-	489	489	489	489
	ins	-	19.25	19.25	19.25	19.25

(1) When taking static pressure readings with equipment removed, it is sufficient to use black PVC adhesive tape for blanking 1/8 in diameter holes.

(2) For 2.25 in (57 mm) diameter holes, and in positions designated 'max. free area', place a suitable blanking plate or restrictor plate over the opening and tape round the edges.

(3) After static pressure tests, ensure that all such temporary blanks are removed.

4. Fan Operating Limitations

Ground running with only 2 forward extraction fans operating may have to be limited in order to restrict operation of racked equipment at temperatures above rated maximum continuous. If cabin temperature exceeds the following values ground running with only 2 forward extraction fans operating must be limited to 1 hour:

33 degrees C at airfield altitude up to 2000 fr.

30 degrees C at airfield altitudes between 2000 and 4000 ft.

24 degrees C at airfield altitudes between 4,500 and 8,500 ft.

5. Test for Fan in Stalled Condition

A. General

When the three forward extract fans are running, one of them may be operating in a condition of aerodynamic stall. This condition is caused by pressure drop due to the blocking or partial blocking of the cooling holes in the racked electrronic equipment, the associated metering plates and the convection cooling holes in the forward electronic racks. These latter holes consist of rows of 0.125 in. or 0.093 in. diameter drillings in the top surfaces of the rack shelves, between some of the adjacent pairs of runner angles and in some of the end seal

CB 08225/00A

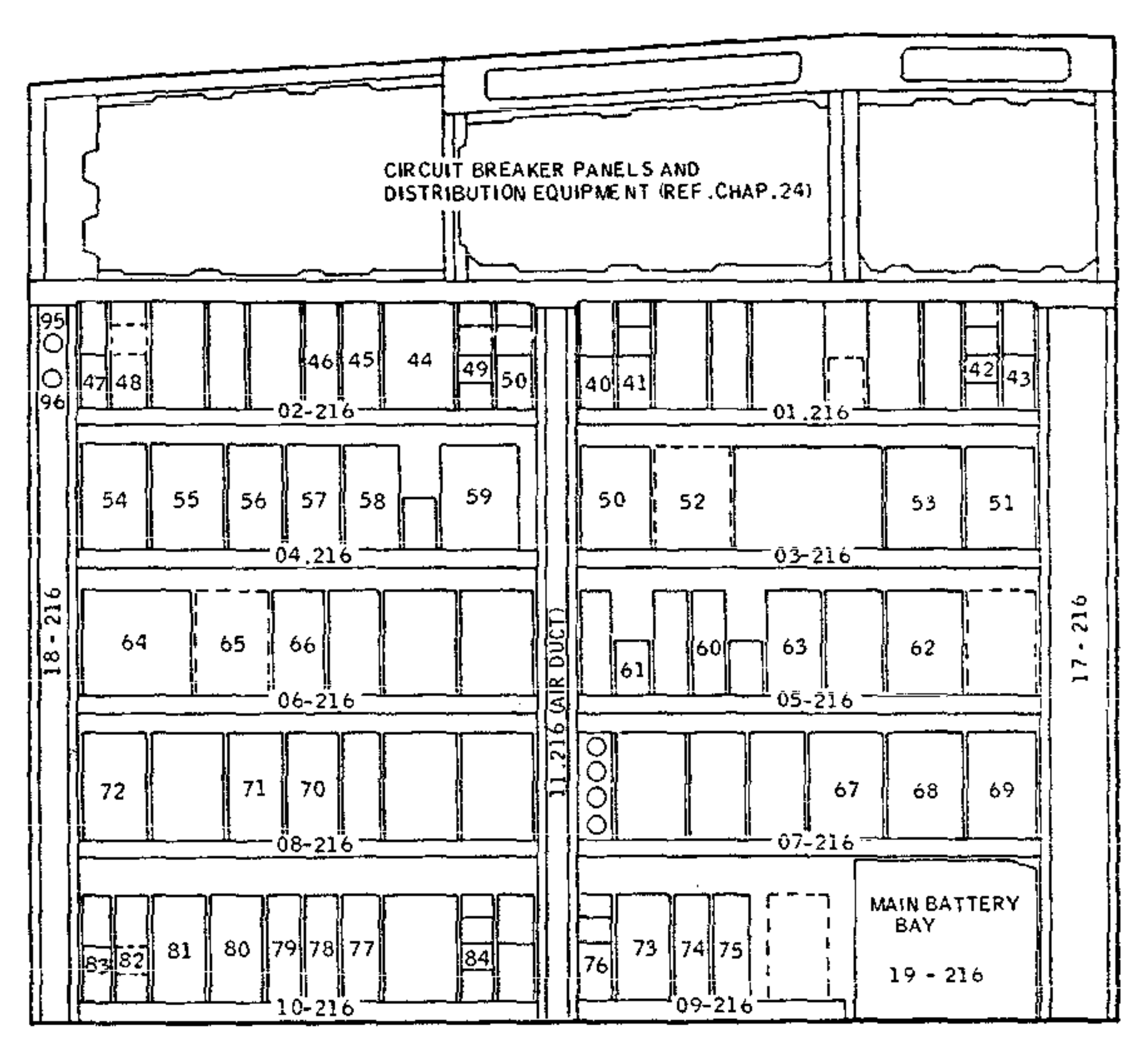


FOR KEY TO EQUIPMENT NUMBERS, REFER TO TABLE 301

CMB 21 21 00 3 AAMA

ARINC Cooled Equipment in Forward Racks LH
(Sheet 1 of 2)
Figure 301

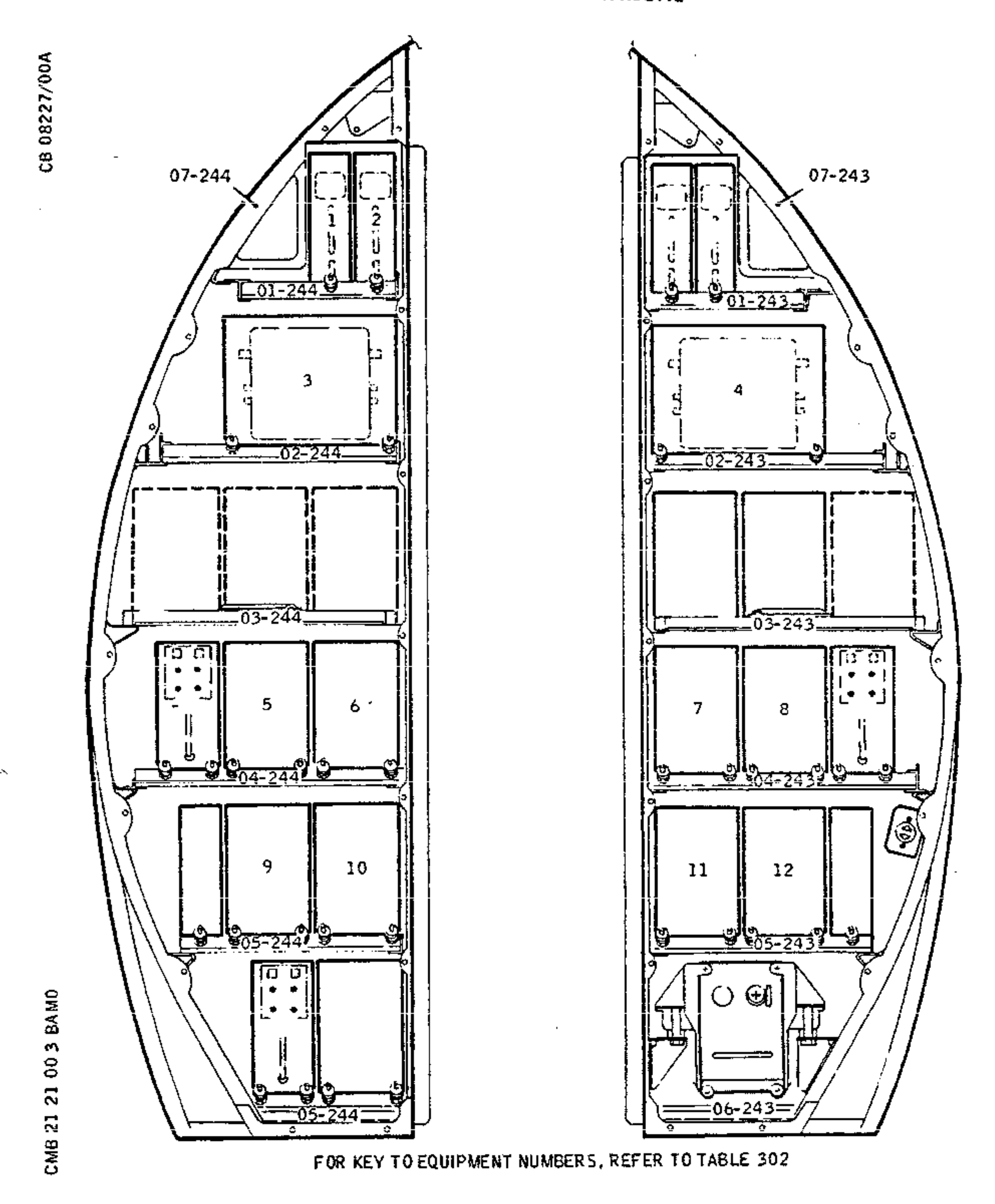
CB 08226/00A



FOR KEY TO EQUIPMENT NUMBERS, REFER TO TABLE 301

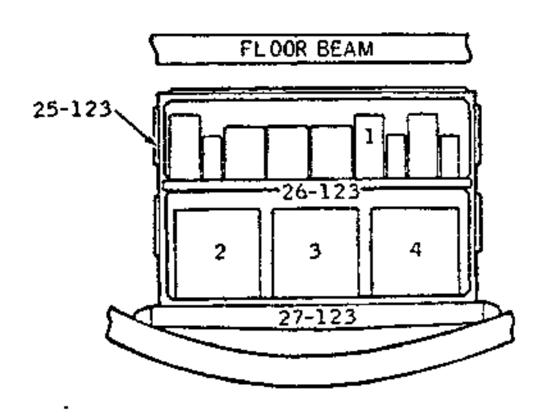
CMB 21 21 00 3 AAMB

ARINC Cooled Equipment in Forward Racks RH
(Sheet 2 of 2)
Figure 301



ARINC Cooled Equipment in Rear Racks
Figure 302

CB 08228/00A



VIEW LOOKING AFT

FOR KEY TO EQUIPMENT NUMBERS, REFER TO TABLE 303

CMB 21 21 00 3 CAMO

ARINC Cooled Equipment in Underfloor Racks
Figure 303

members. It has been found that by cleaning these holes the effect on the forward rack flow and fan performance can be minimised.

Fan stall is most likely to occur if either:

(a) Fans 1 and 3 are switched on before fan 2.

or

(b) The three fans are switched on simultaneously.

Under these circumstances, fan 2 is the one that will stall.

If fan 2 is switched on before fans 1 and 3, there is less likelihood of fan stall occurring, but if it does, it may be either fan 1 or fan 3, depending on which is the slower in running up to full speed.

There is little visual evidence when a fan is running in the stalled condition, although the total mass flow

through the forward extract system will be reduced by approximately 10%. While this is not regarded as serious, steps should be taken to minimise it.

B. Test

(1) Make available electrical ground power (Ref. 24-21-00).

(2) Make available the ground supply of pre-conditioned air (Ref. 12-14-21).

(3) Ensure that the switches and indicators on the equipment bay cooling panel are at the normal ground state (Ref. 21-21-00, Adjustment/Test) which is as follows:

EMERGY RELIEF	SHUT
FWD SUPPLY FAN	NORM
FWD EXTRACT	
FAN 1 & 3	AUTO
FAN 2	AUTO
REAR EXTRACT FANS	
LH & RH	ON
STANDBY	OFF

and the associated magnetic indicators must show ON.

(4) Test the forward FLOW caption light filaments by pressing the filament test push switches.

(5) Set the CABIN PRESSURE CONTROL DISCHARGE VALVES switches on panel 1-214 "NORM".

(6) Note the reading of the FWD FLOW indicator as accurately as possible.

(7) Select the FWD EMERGY RELIEF valve switch to "OPEN" and check that the associated magnetic indicator shows OPEN. Select the switch "SHUT" and check that the magnetic indicator shows SHUT.

(8) Note carefully again the reading of the FWD FLOW indicator. If there is no perceptible increase in the reading from that observed under operation (6), the fans are operating normally.

NOTE: A perceptible increase in the reading indicates

that a fan is operating in the stalled condition. In this case, carry out the vacuum cleaning procedure (Ref. 21-00-00, Cleaning/Painting), and re-test.

AIR EXTRACTION - REMOVAL/INSTALLATION

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED IN 24-00-00.

R 1. General (Ref. Fig.401 and 402)

This topic deals with the removal and installation of air ducts, and minor electrical equipment such as switches, indicators, relays and contactors fitted to panels that are common to sub-systems within this section.

Ducting is fabricated in lengths convenient for handling and installation and is secured to the structure by light-weight metal clamps, usually two clamps to each length of duct. The clamps are lined with flexible strips which allow movement without chafe. The location of all duct clamps and joints is shown, also typical types of clamps and joints that are used for securing ducting. When installed, ducts must align with each other within specified limits. Joints which are taped and bonded in-situ are considered permanent and will not require to be separated during service.

The electrical equipment panels covered in this topic are:
Equipment bay cooling panel (2-214)
Forward underfloor equipment bay racking panels (7-123, 8-123, 14-123, 17-123, 21-123, 23-123).
For some components it is necessary to remove the associated electroluminescent panel (Ref.Chapter 33). These panels are electrically connected by flying leads or terminal connections at the back of the panel.

Special tools may be required such as thin walled tubular hexagon or peg spanners for switches; cruciform (straight and offset) screwdrivers for magnetic indicators and cable insertion/extraction tools for various cable sizes on components fitted with pin-type connectors.

The relays and contactors are mounted in box panels on racks in the forward underfloor equipment compartment (zone 123). Sufficient cable is provided to allow each box to be withdrawn from its rack for removal of individual components without electrically disconnecting the box, thus subsequent test procedures are confined to only the associated circuit.

R 2. Ducts (Ref. Fig. 401, 402 and 403)
R (Ref. Fig.404 and 405)

CAUTION: BEFORE OPENING ANY AIR EXTRACTION DUCTING DISCONNECT ALL ELECTRICAL POWER. THIS IS TO SAFEGUARD ELECTRONIC EQUIPMENT WHILE THE

COOLING AIR SYSTEM IS INOPERABLE.
DO NOT APPLY WEIGHT TO DUCTING.

A. Equipment and Materials

	DESCRIPTION	PART NO.
R R	Screwdriver torque limiting 0-10 lbf in (0-0.11 mdaN)	-
R R	Torque spanner 0-50 lbf in (0-057 mdaN)	-
R R	Corrosion-resistant steelwire 0.031 in (0.8 mm) dia.	DTD189
R R	Nomex cord (Ref.20-30-00, No.163)	CM346
R	Cleaning solvent (Ref.20-30-00, No. 473)	BACM302
	Methylethylketone (MEK) (Ref.20-30-00, No. 470)	-

B. Prepare to Remove

NOTE: Air extraction ducting is distinguished by being uninsulated and by the part numbers placed at the ends of each length of ducting.

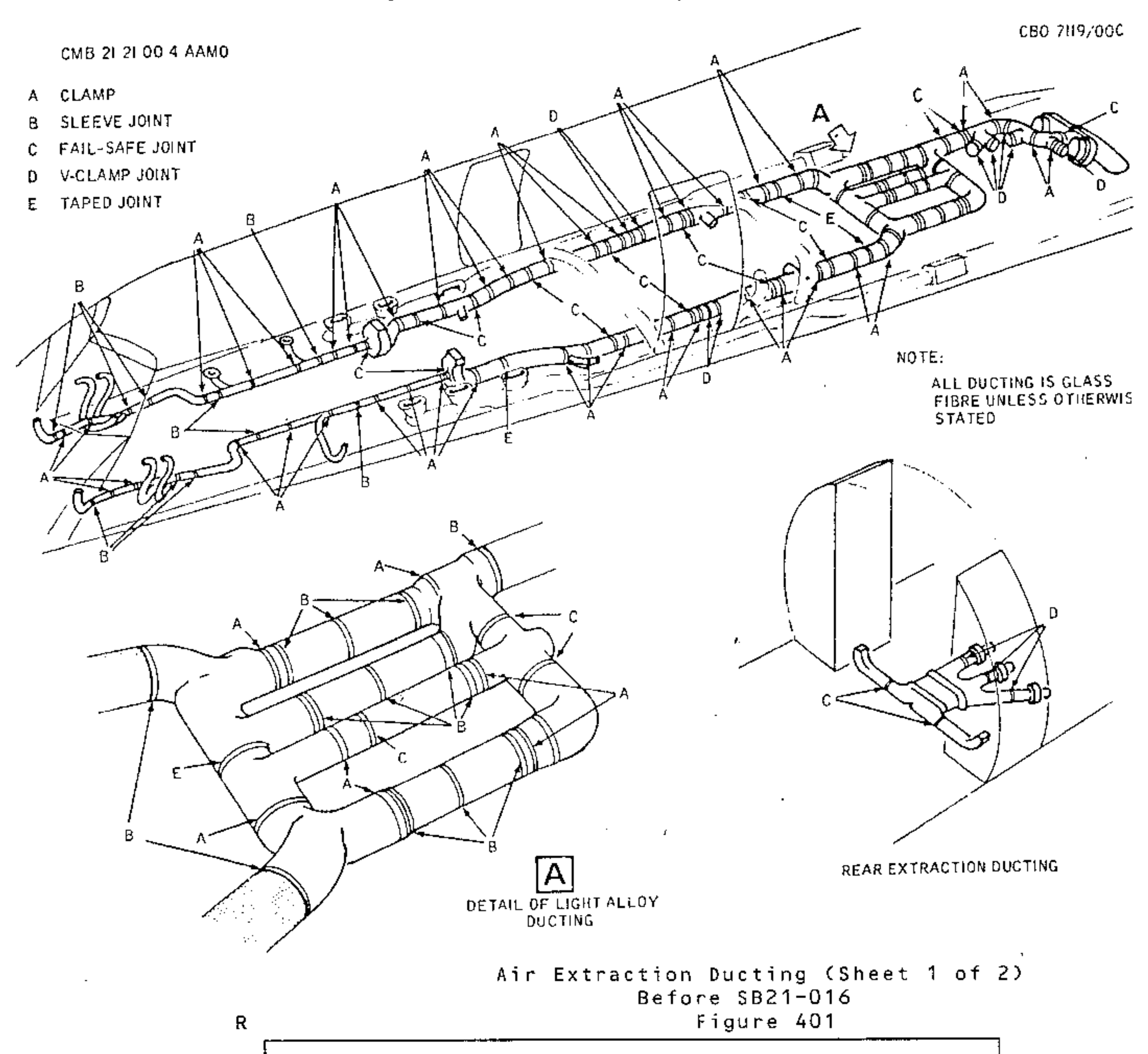
Where the removal includes moving an electrical component, refer also to the appropriate component topic.

(1) Check that electrical power is disconnected and place warning notices on the electrical ground power panel stating that electrical power must not be reconnected.

(2) Connect a ground air conditioning supply if required (Ref.12-14-21).

(3) Remove furnishings, as necessary, to expose the working floor area.

(4) Remove floor panels as required to expose the

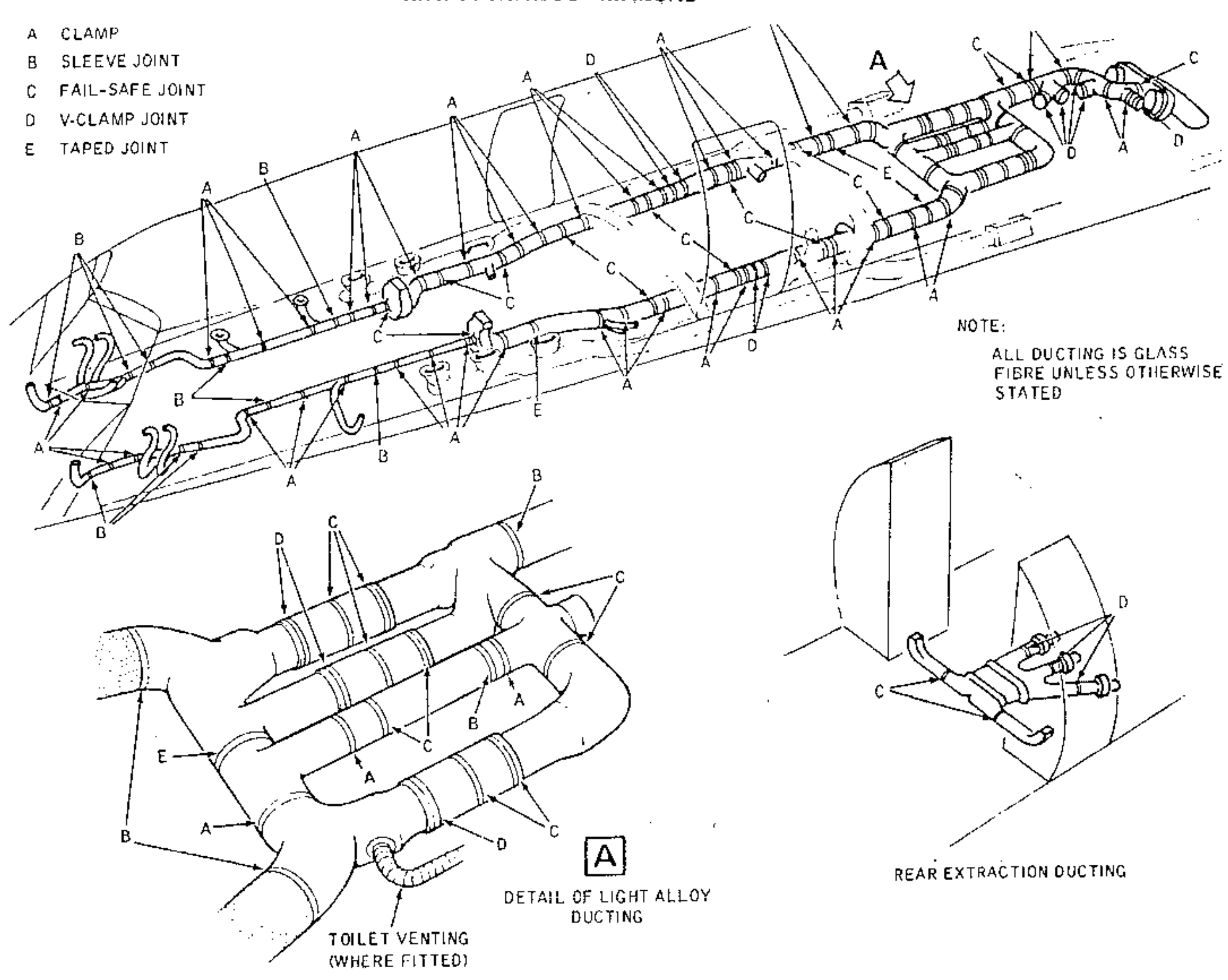


Air Extraction Ducting (Sheet 1 of 2)
Before SB21-016
Figure 401

R

EFFECTIVITY: ALL

BA

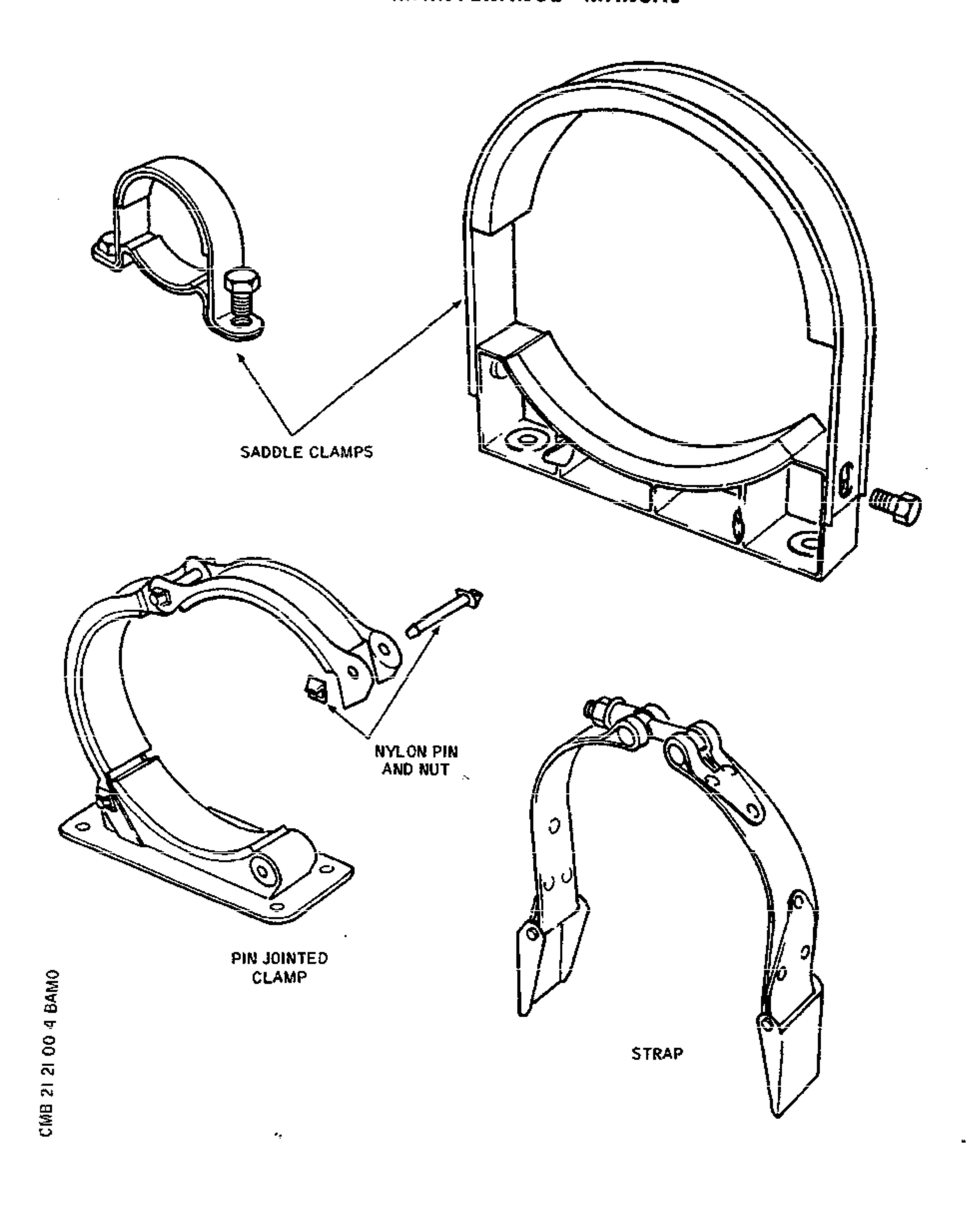


Air Extraction Ducting (Sheet 2 of 2)
After SB21-016
Figure 402

R

EFFECTIVITY: ALL

BA



Typical Duct Clamps
Figure 403

underfloor ducting.

C. Remove

NOTE: The most convenient piece of ducting to remove first, is one having sufficient clear space for removal sideways from the line of ducting. Once an opening has been made it is usually only necessary to undo one side of successive sleeve joints to effect the removal of further lengths of ducting.

(1) Loosen the clamps on the duct joints and slide them aside from the joint.

(2) Insert a thin blade under the joint sleeves in the area of the clamps and work round the duct to free the sleeves. Work the sleeves clear of the joints.

R NOTE: Where the joints are of the 'fail safe' type, cut
R the cords and slide the 'fail safe' straps away from the joints.

(3) Disconnect bonding leads where fitted.

(4) Undo the duct mounting brackets and remove the section of ducting.

R (5) Retain all fastenings, joint sleeves, 'fail safe' straps and 'V' clamp 'O' rings, which are suitable for re-use.

(6) Immediately cover all the exposed duct ends with
R polythene bags or other approved blanks.

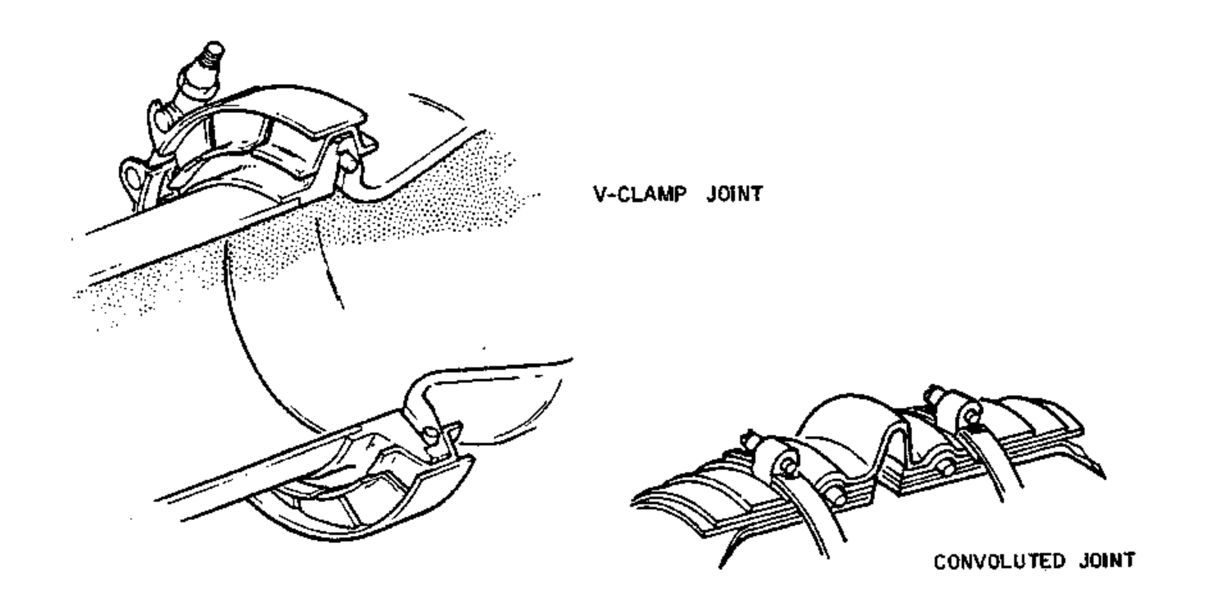
D. Install

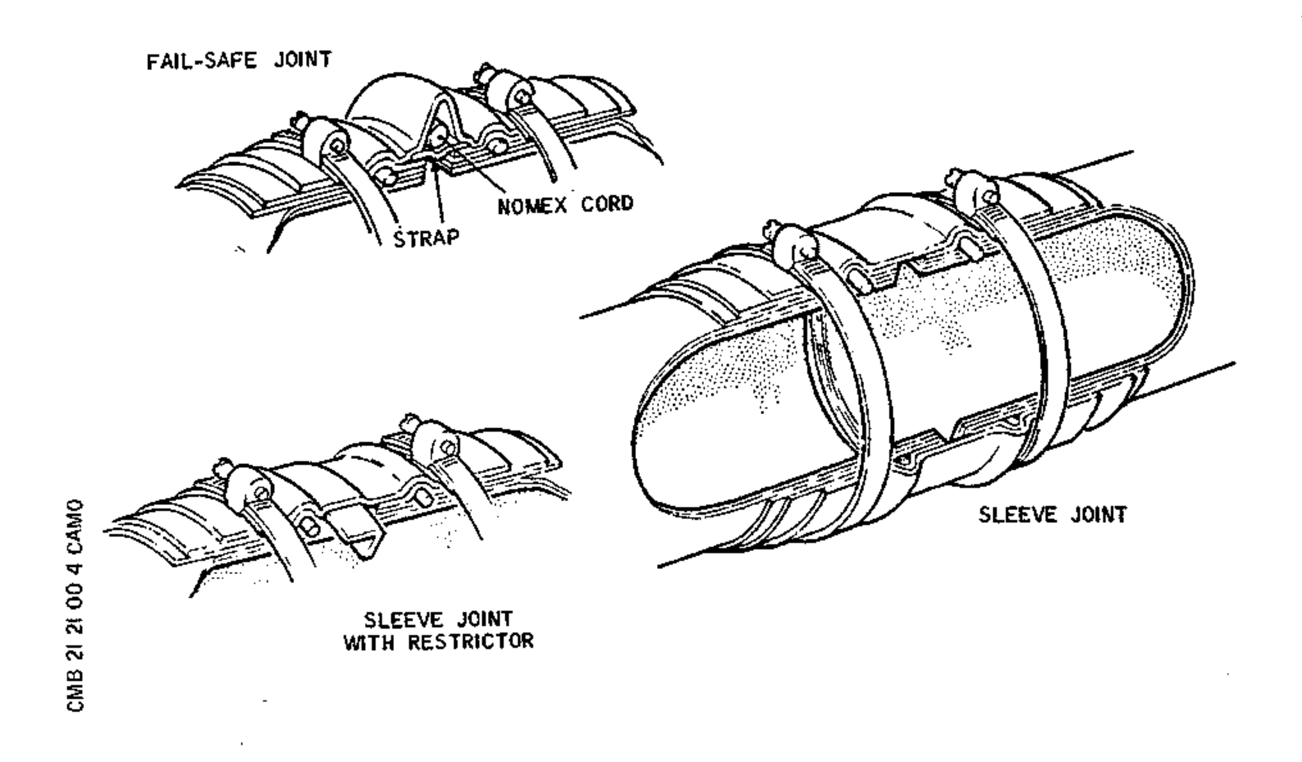
R (1) Comply with the electrical safety precautions.

R (2) Ensure that all ducts and fittings are clean and
R dry before assembly.

R (3) Remove the protecting blank covers and thread the required joint components onto the ducts. (Ref. Fig. 404). Install ducts in position in their mounting brackets ensuring that debris guards, and restrictors, where fitted, are placed in their original positions.

R (4) Manipulate, as necessary, to bring 'fail safe' joints and 'V' clamp joints into accurate alignment





Typical Duct Joints
Figure 404

CB07122/00B

MAX. 0.3 in (7.6 mm)
MIN. 0.1 in (2.6 mm)
0.05 in (1.3 mm) MAX.

SLEEVE JOINT

MAX. 0.3 in (7.6 mm)
MIN. 0.1 in (2.6 mm)
0.10 in (2.6 mm) MAX.

CONVOLUTED JOINT

CMB 21 21 00 4 DAMO

MAX. 0.3 in (7.6 mm)
MIN. 0.2 in (5.1 mm)

FAIL-SAFE JOINT

Duct End Clearance and Alignment
Figure 405

(Ref. Fig. 405) and tighten. Saddle clamp fastenings and screwdriver head fastenings are
R hand tightened to a nominal torque. 'V' clamps are
R torque-tightened (Ref. Table 401).

R (5) Check that the remaining sleeve joints and convoluted sleeve joints align within the tolerances given in the illustration (Ref. Fig. 405) and tighten. Joint clips with screwdriver slots are
R hand tightened to a nominal torque.

E. Conclusion

(1) Carry out an operational test of the air extraction system in accordance with 21-21-00, Adjustment/Test.

(2) Check the newly assembled joints and any repaired
R area of duct for leaks, by feel, and rectify as necessary.

R (3) Reconnect bonding leads, if applicable.

R (4) Replace floor panels (Ref. 53-21-11 or 21, Removal/Installation).

R (5) Restore furnishings to their original position.

Janitrol 'V' Clamps to NSA8603	
Diameter	Torque
Sizes up to 2.0 in (50.8 mm)	30 to 40 lbf in (0.34 - 0.45 mdaN)
Sizes above 2.0 in (50.8 mm)	45 to 50 lbf in (0.51 - 0.57 mdaN)

Table 401 - 'V' Clamp Torque Settings

3. Equipment Bay Cooling, Panel 2-214, Components (Ref. Fig. 406)

A. Prepare to Remove Components

(1) Isolate the electrical generation and external power in accordance with 24-00-00, Servicing.

(2) Release the quick-release fasteners securing the panel and hinge the panel forward.

B. Remove Toggle Switch (Electrical code H1188, H1190, H1191, H1192, H1285, 1H1189, 2H1189).

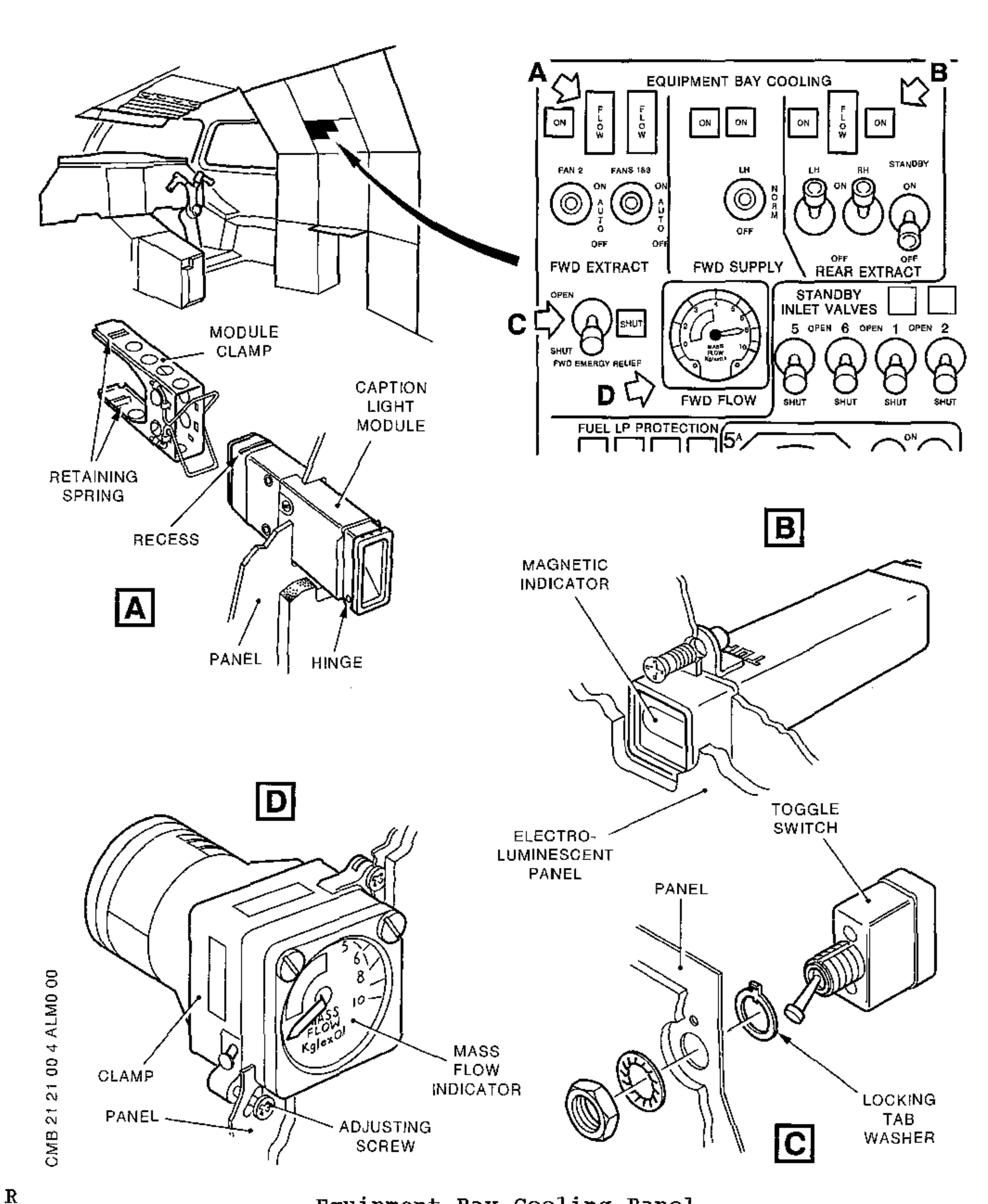
(1) On a switch with screw-type terminals roll back the rubber terminal cover and disconnect the electrical cables from the switch. On a switch with socket-type terminals withdraw the pin inserts from the back of
R the switch with an insertion/extraction tool.

(2) Remove the nut, lockwasher and locating tabwasher and remove the switch from the back of the panel.

C. Install Toggle Switch

(1) Comply with the electrical safety precautions.

(2) Insert the switch from the rear of the panel with the locating tabwasher ensuring that the tab engages
R in the locating hole in the panel. Secure the switch
R with the washer and nut.



R

Equipment Bay Cooling Panel
Components - Installation
Figure 406

(3) Connect the cables to the switch terminals ensuring that the connections are made in accordance with the cable identifications and the applicable wiring diagram. Position the rubber cover over the screw-type terminals.

D. Remove Magnetic Indicator (Electrical Code H1206, H1287, 1H1205, 1H1208, 2H1205, 2H1208).

(1) Remove the cable inserts from the rear of the indicator.

(2) Remove the electroluminescent panel (Ref.33-16-00) to gain access to the indicator attachment screws.

(3) Remove the two attachment screws and withdraw the indicator from the rear of the panel.

E. Install Magnetic Indicator.

(1) Comply with the electrical safety precautions.

(2) Insert the magnetic indicator in the panel from the
R rear, ensuring that the word "TOP" on the body of the indicator corresponds with the white painted line at the back of the panel, and secure it with the two screws.

(3) Refit the electroluminescent panel in accordance with the instructions in 33-16-00.

(4) Connect the electrical cable inserts to the indicator terminals ensuring that the connections are made in accordance with the cable identifications and the applicable wiring diagram.

F. Remove Caption Light Module (Electrical Code H1209, H1210, H2025).

(1) Disconnect the electrical cables from the module terminals. On modules with socket type terminals withdraw the pin inserts from the rear of the module.

(2) Disengage the clamp retaining springs at the rear of the module and withdraw the module from the front of the panel and the clamp from the rear.

G. Install Caption Light Module.

(1) Comply with the electrical safety precautions.

(2) Insert the caption light module through the aperture from the front of the panel, ensuring that the hinged edge of the module corresponds with the painted white line of the back of the panel, and position the clamp symmetrically with the module at the rear of the panel.

(3) Hold the module firmly against the front of the panel and press the clamp into position from the rear until the retaining springs engage the recesses in the module body.

(4) Connect the electrical cables to the module ensuring that the connections are made in accordance with the cable identifications and the applicable wiring diagram manual.

H. Remove Air Mass Flow Indicator (Electrical Code D204)

(1) Disconnect the electrical connector from the back of the indicator.

(2) Release the clamp securing the indicator by unscrewing the adjustment screw on the front of the panel.

(3) Withdraw the indicator from the front of the panel.

J. Install Air Mass Flow Indicator.

(1) Comply with the electrical safety precautions.

R (2) Insert the indicator in the panel aperture and secure it in the clamp by torque-tightening the clamp adjusting screw to between 5 and 8 lbf in (0.056 and 0.090 mdaN).

(3) Connect the electrical connector to the indicator ensuring the mating surfaces are clean and undamaged.

R K. Conclusion.

R (1) Close and secure the panel with the fasteners.

(2) Cancel the electrical safety precautions and carry out a complete operational test on the air extraction system as detailed in 21-21-00.

4. Forward Underfloor Equipment Rack Panel, 7-123, 8-123, 17-123 and 14-213 Components (Ref. Fig. 407)

A. Prepare to Remove Components.

(1) Isolate the electrical generation and external power in accordance with 24-00-00, Servicing.

(2) Open access panels 123AB and 123BB to gain access to equipment rack panel 17-123 in the forward underfloor equipment compartment.

(3) Release the hold-down fasteners securing the panel box. Withdraw the box sufficiently to gain access to the quick release cable clamps on top of the box and release the cables from the clamps.

(4) Withdraw the box from the rack and place it on a suitable working support.

B. Remove Relay (Electrical Code H1213, 2H1193, 2H2020, H2021, H2014, 1H1193, H1794, 1H2020).

(1) Remove the nuts or the spring clamp, as applicable, securing the relay to its socket base and withdraw the relay from the socket.

C. Install Relay.

(1) Comply with the electrical safety precautions.

(2) Plug the relay into the socket base and secure it with the nuts or spring clip, whichever is applicable.

NOTE: Check that the mounting lugs of 'half crystal can size' relays are at 90 deg to the relay body. Re-align the lugs as necessary.

D. Remove Diode (Electrical Code H1215, H1217, H1222, H2023, H2024).

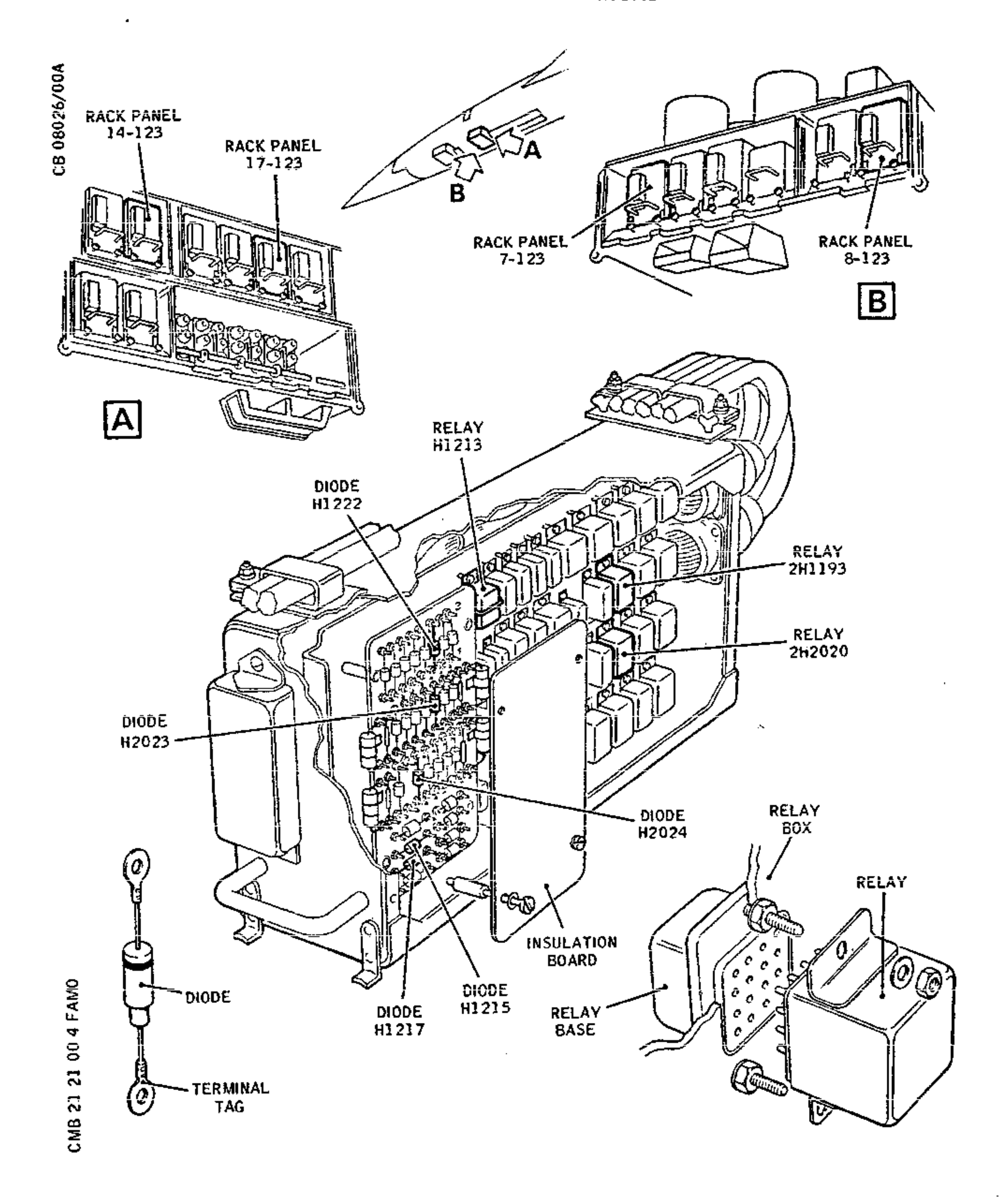
(1) Remove the diode board cover.

(2) Remove the nut and washer securing each end of the diode and withdraw the diode from the mounting studs.

E. Install Diode.

(1) Comply with the electrical safety precautions.

(2) Assemble the diode to the mounting studs fitting a plain washer first, ensuring that the cathode end (identified by a painted band) is fitted to the stud marked '2', and secure it with a crinkle washer and nut.



Underfloor Rack Panels, Typical Installation
of Relays and Diodes
Figure 407

NOTE: If a replacement diode does not have tags fitted, terminal tags must be crimped to the wire ends in accordance with the WDM, 20-21-01. Tags for diodes are pin '1', Solidstrand AMP 34105 and for pin '2', Solidstrand 34104 T006-02.

(3) Secure the cover to the diode board with screws and washers.

R F. Conclusion.

(1) Place the panel box on the rack support rails and secure the cables in the quick release clamps.

(2) Slide the box into place and secure it with the hold-down fasteners.

(3) Check that the panel box is bonded in accordance with 20-27-11.

(4) Cancel the electrical safety precautions and carry out the complete operational test for the air extraction system given in 21-21-00, Adjustment/Test.

5. Forward Underfloor Compartment Rack Panels, 21-123 and 23-123, Components (Ref. Fig. 408)

A. Prepare to Remove Components.

(1) Isolate the electrical generation and external power in accordance with 24-00-00, Servicing.

(2) Open access panel 123BB to gain access to the equipment rack panels in the forward underfloor equipment compartment.

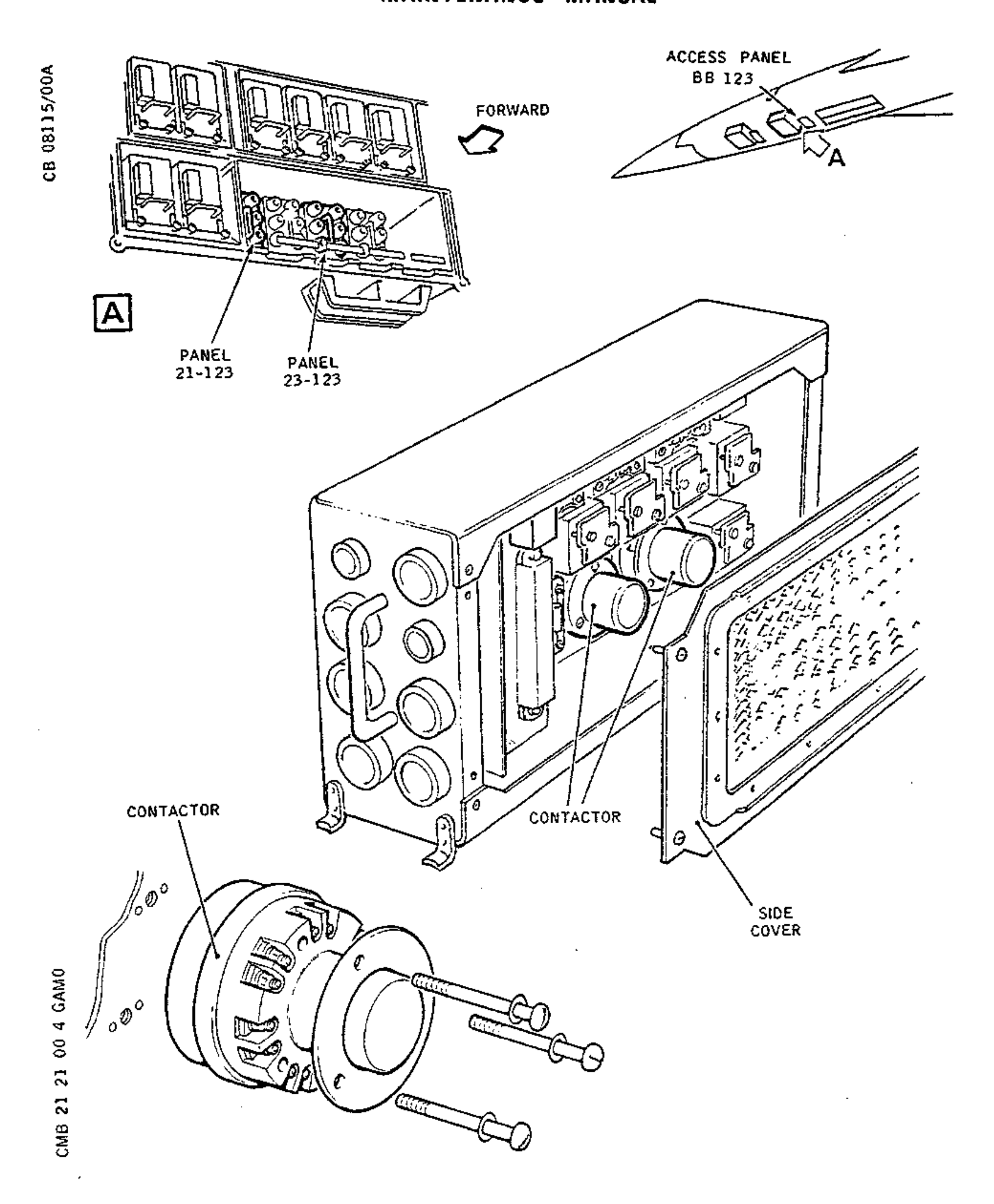
(3) Release the hold down fasteners securing the panel box, withdraw the box from the rack and place it on a suitable support.

NOTE: Cable clips may be released to facilitate the withdrawal of the box.

(4) Release the quick release fasteners and remove the side cover from the box.

B. Remove Contactor (Electrical Code H1194, H1195, H2012).

(1) Remove the contactor terminal cover.



Underfloor Rack Panels, Installation
of Contactors
Figure 408

(2) Disconnect the electrical cables from the contactor terminals.

(3) Remove the three bolts securing the contactor and remove the contactor from the panel.

C. Install Contactor.

(1) Comply with the electrical safety precautions.

(2) Remove the contactor terminal cover.

(3) Assemble the contactor to the panel with the three bolts.

(4) Connect the electrical cables to the contactor terminals ensuring that the connections are made in accordance with the cable identifications and the
R applicable wiring diagram. Torque-tighten the Kaylock nut/washers on the main terminals (6-32 UNC) to between 8 and 9 lbf in (0.09 and 0.10 mdaN) and on the remaining terminals (4-40 UNC) to between 4 and 5 lbf in (0.045 and 0.056 mdaN).

(5) Refit the terminal cover to the contactor.

(6) Check that the contactor is bonded in accordance with 20-27-11.

R D. Conclusion.

(1) Refit the side cover to the panel box.

(2) Place the panel box on the rack support rails, slide the box into place and secure it with the hold-down fasteners. Refit any cable clips that may have been removed.

(3) Check that the panel box is bonded in accordance with 20-27-11.

(4) Cancel the electrical safety precautions and carry out the forward extraction system operational test (Ref.21-21-00, Adjustment/Test).

AIR CONDITIONING - AIR EXTRACTION - ADJUSTMENT/TEST

WARNING: OBSERVE THE ELECTRICAL PRECAUTIONS DETAILED IN 24-00-00.

1. General

An operational test proves the integrity of the forward supply and extract system and the rear extract system. A further check on the system ducting, duct joints and non-return valves is achieved by a functional test.

The controls and indicators for the systems are grouped on the equipment bay cooling section of panel 2-214 at the 3CM station (Ref. Fig. 501). All control switches are of the locked toggle type and the toggle must be pulled before it can be used.

The discharge valves are controlled from the cabin pressure control section of panel 1-214, also at the 3CM station. Unless specifically stated otherwise it is important that all the racking equipment, furnishing and floor panels are fitted when the tests are made.

It should be noted that, if all the fans in either extraction system are stopped, the ground call horn will be operated after approximately six seconds. Correct flow indications also prove the correct operation of non-return valves (NRV).

2. Equipment and Materials

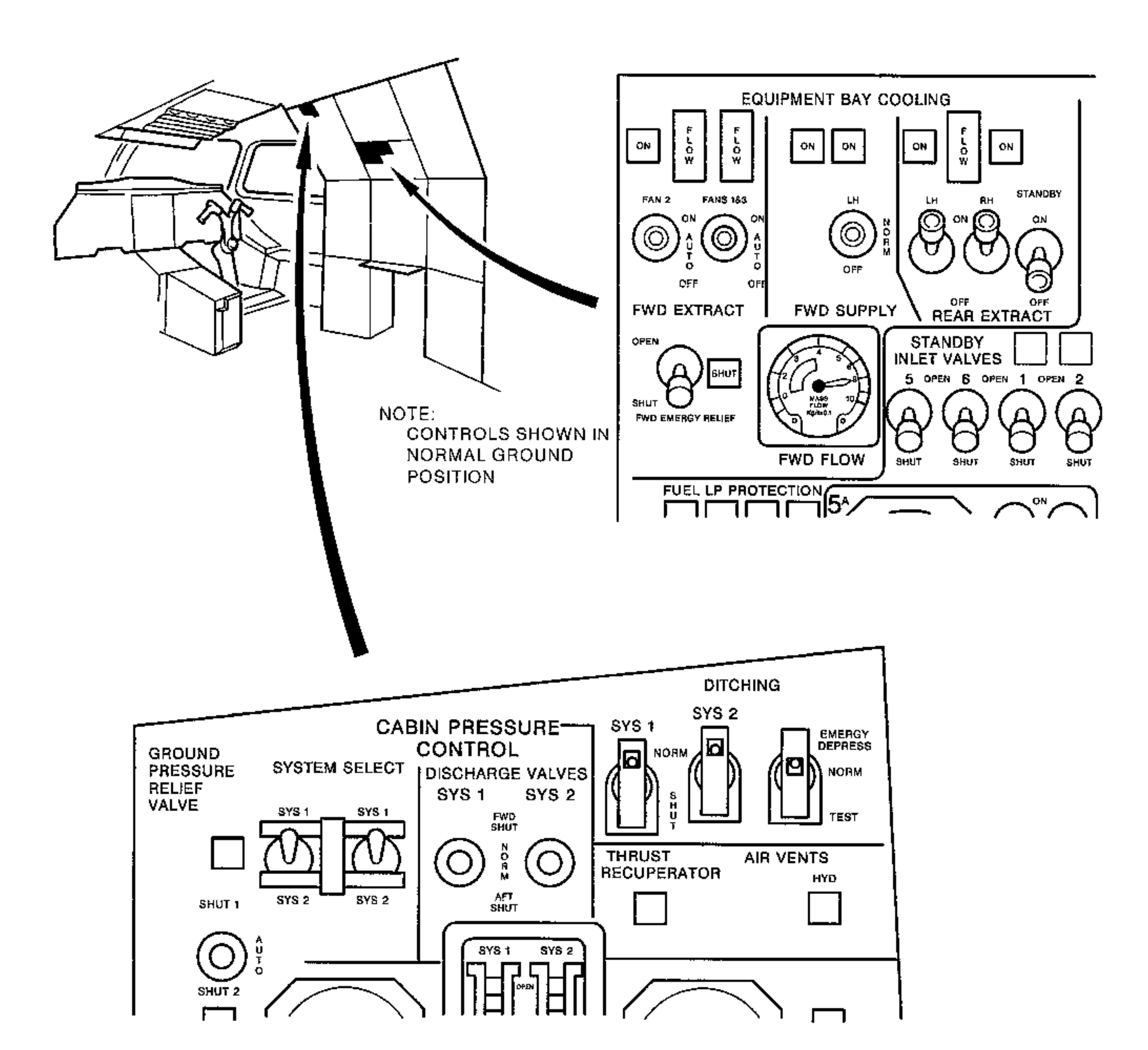
	DESCRIPTION	PART NO.
B B	Water manometer.	CRIE 4123 (Code HZAG 2016)

3. Operational Test - System

A. Prepare to Test

(1) Make available electrical ground power (Ref. 24-41-00).

(2) Make available the ground supply of pre-conditioned air (Ref. 12-14-21).



CMB 21 21 00 5 AAM0 00

R

Air Extraction - Controls and Indicators
Figure 501

(3) Ensure that the switches and indicators on the equipment bay cooling panel are at the normal ground state (Ref. Fig. 501).

The fan switches must be set:

EMERGY RELIEF	SHUT
FWD SUPPLY FAN	NORM
FWD EXTRACT	
FAN 1 & 3	AUTO
FAN 2	AUTO
REAR EXTRACT FANS	
LH and RH	ON
STANDBY	OFF

and the associated magnetic indicators must show ON.

(4) Test the FLOW caption light filaments by pressing the filament test push-switches.

(5) Test the ground call horn by pressing the pilot's GRND CALL button on the pilot's roof panel 4-211 (Ref. Fig. 502).

(6) Set the CABIN PRESSURE CONTROL DISCHARGE VALVES switches on panel 1-214 to NORM.

B. Forward Supply System Test

(1) Set the FWD SUPPLY switch to OFF and check that the associated magnetic indicators show OFF.

(2) Set the FWD SUPPLY switch to NORM and check aurally, that the fans are operating and that the associated magnetic indicators show ON. Access to the FWD supply fans may be gained through access panel 123 BB.

(3) Check the static pressure drop on the forward supply system filters (Ref. 21-21-29).

C. Forward Extraction System Test

(1) Press the FWD EXTRACT FLOW captions (to simulate fan failure). Check that the FLOW caption is illuminated and that there is an AIR master warning. Release the FLOW caption and check that the caption is extinguished and that the AIR master warning is cancelled.

(2) Check that the FWD FLOW indicator shows 0.85 - 1.1

kg/s.

(3) Select FWD EMERGY RELIEF valve switch "OPEN" and check that the associated magnetic indicator shows OPEN. Select the switch "SHUT" and check that the magnetic indicator shows SHUT.

(4) Select FWD EXTRACT FAN 2 switch "OFF". Check that the associated magnetic indicator shows OFF, the LH and RH forward FLOW captions remain extinguished and the FWD FLOW indicator reads 0.7 - 0.85 kg/s.

(5) Select FWD EXTRACT FANS 1 & 3 switch "OFF". Check that the LH and RH forward FLOW captions illuminate, the AIR master warning activates and audio gong sounds, and that the FWD FLOW indicator reads zero. Check also that ground call horn sounds after approximately six seconds.

NOTE: If the ground call horn does not sound within 10 seconds, fan circulation should be restored.

B (6) Select FWD EXTRACT FAN 2 switch "ON". Check that the LH and RH forward FLOW captions are on or off (intermediate state), the AIR master warning is correspondingly on or off and that the FWD FLOW indicator reads 0.4 - 5.5 kg/s.

B (7) Select FWD EXTRACT FANS 1 & 3 switch "ON". Check that the LH and RH forward FLOW captions are extinguished, the AIR master warning is extinguished the FWD EXTRACT magnetic indicator shows ON and the FWD FLOW indicator reads 0.85 - 1.1 kg/s.

(8) Test the duct outward relief valve by closing both forward cabin pressure regulating discharge valves SYS 1 and SYS 2. Check that the FWD FLOW indicator reads approximately 0.76 kg/s. Reset both forward discharge valves to "NORM".

B (9) Select FWD EXTRACT FANS 1*3, and FAN 2 switches to
B "AUTO".

D. INS Ventilation Failure Warning

(1) Test the ground call horn by pressing the pilots GRND CALL button on the roof panel 4-211 (Ref. Fig. 502).

(2) Switch off ground power by holding the ground power

control switch on panel 3-214 at the 3CM station to "TRIP". Release the switch.

(3) Turn the INS2 mode selector switch on the 3CM centre panel to "ALIGN". The ground call horn should then sound.

(4) Set the INS2 mode selector switch to "OFF". The ground call horn should then stop.

(5) Restore ground power by holding the ground power control switch to "CLOSE". Release the switch.

E. Rear Extraction System Test

(1) Press the REAR EXTRACT FLOW caption (to simulate fan failure). Check that the flow caption is illuminated and that there is an AIR master warning. Release the REAR EXTRACT FLOW caption and check that the caption is extinguished and that the AIR master warning is cancelled.

(2) Test each of the three fans in turn as scheduled in Table 501. The test is to ensure that each fan is capable of maintaining the required air flow in the system.

TEST	OPERATION 1	OPERATION 2	OPERATION 3
LH Fan	Switch OFF RH fan	Switch OFF LH fan	Switch ON RH fan
RH Fan	RH fan only now ON	Switch OFF RH fan	Switch ON Stand-by fan
Stand-by Fan	Standy-by fan only now ON	Switch OFF Stand-by fan	Switch ON LH and RH fans

INDICATIONS

Operation Indication

1. FLOW caption remains unlighted. Magnetic indicators display appropriately.
2. FLOW caption illuminated. AIR master warning given. Magnetic indicators show OFF. Ground call horn sounds after 6 seconds.
   Note: There is no magnetic indicator for the stand-by fan.

Rear Extraction Fans - Operational Test Sequence

TEST	OPERATION 1	OPERATION 2	OPERATION 3

Table 501

**ON A/C 006-007,

F. Ground Power Breaker Trip Test

(1) Give adequate warning to personnel working on the aircraft that there will be brief loss of electrical ground power.

(2) On EQUIPMENT BAY COOLING panel 2-214, select FWD EXTRACT FAN switches "OFF" and check that electrical ground power is automatically disconnected after a delay of 45 seconds.

(3) Reset FWD EXTRACT FAN switches "AUTO".

(4) On shelf 12-216 on the RH rack structure (Ref. Fig. 502) set the ground power inhibit switch to "OVERRIDE" and check that ground power is restored.

(5) On panel 3-214 hold the ground power control switch to "TRIP" and release. Check that ground power is disconnected and that the ground power inhibit switch return to "NORMAL".

(6) Hold the ground power control switch to "CLOSE" and check that ground power is restored. Release the switch.

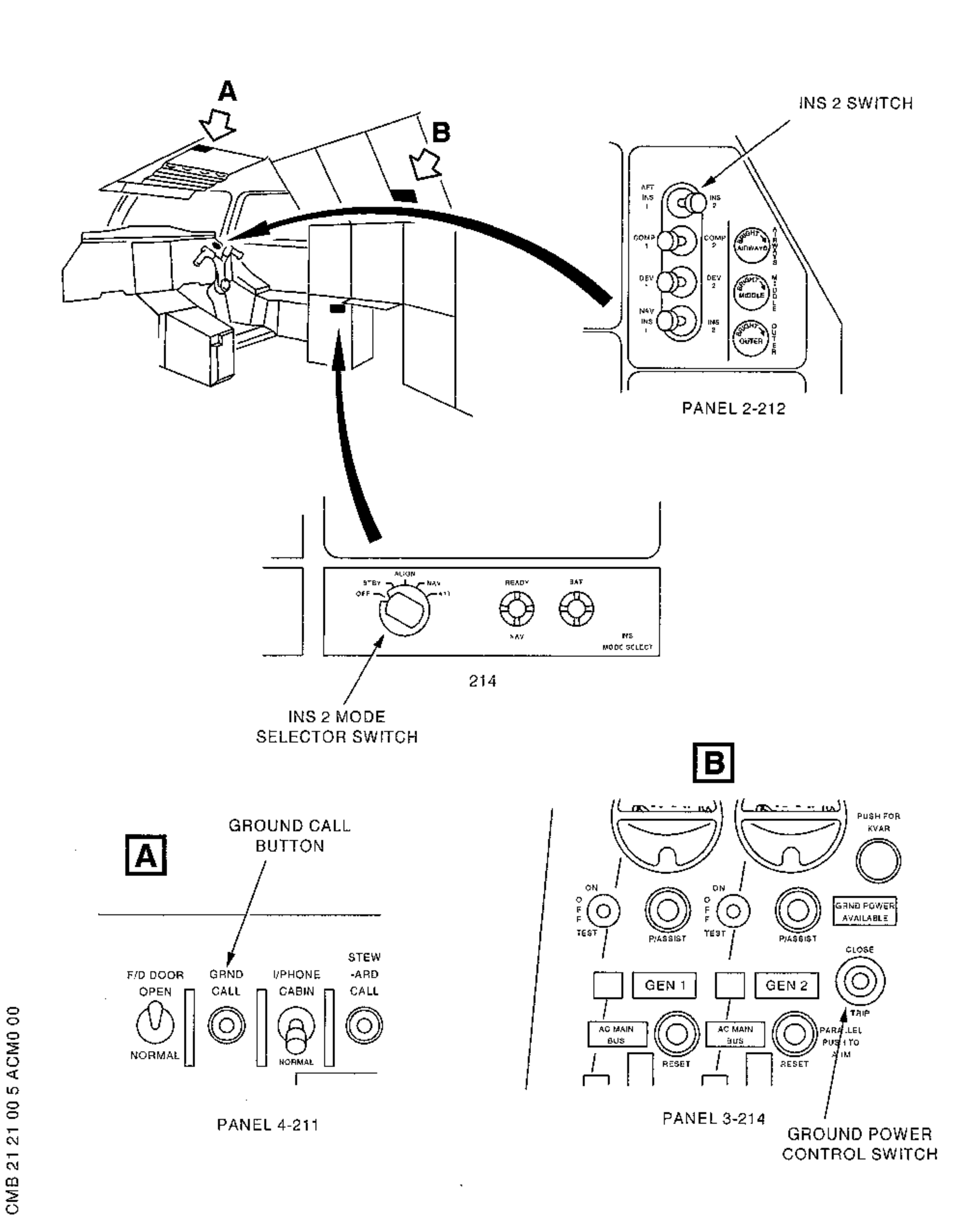
(7) On EQUIPMENT BAY COOLING panel 2-214, select REAR EXTRACT fan switches "OFF" and check that ground power is automatically disconnected after a delay of 45 seconds.

(8) Reset the REAR EXTRACT LH and RH fan switches to "LH" and "RH".

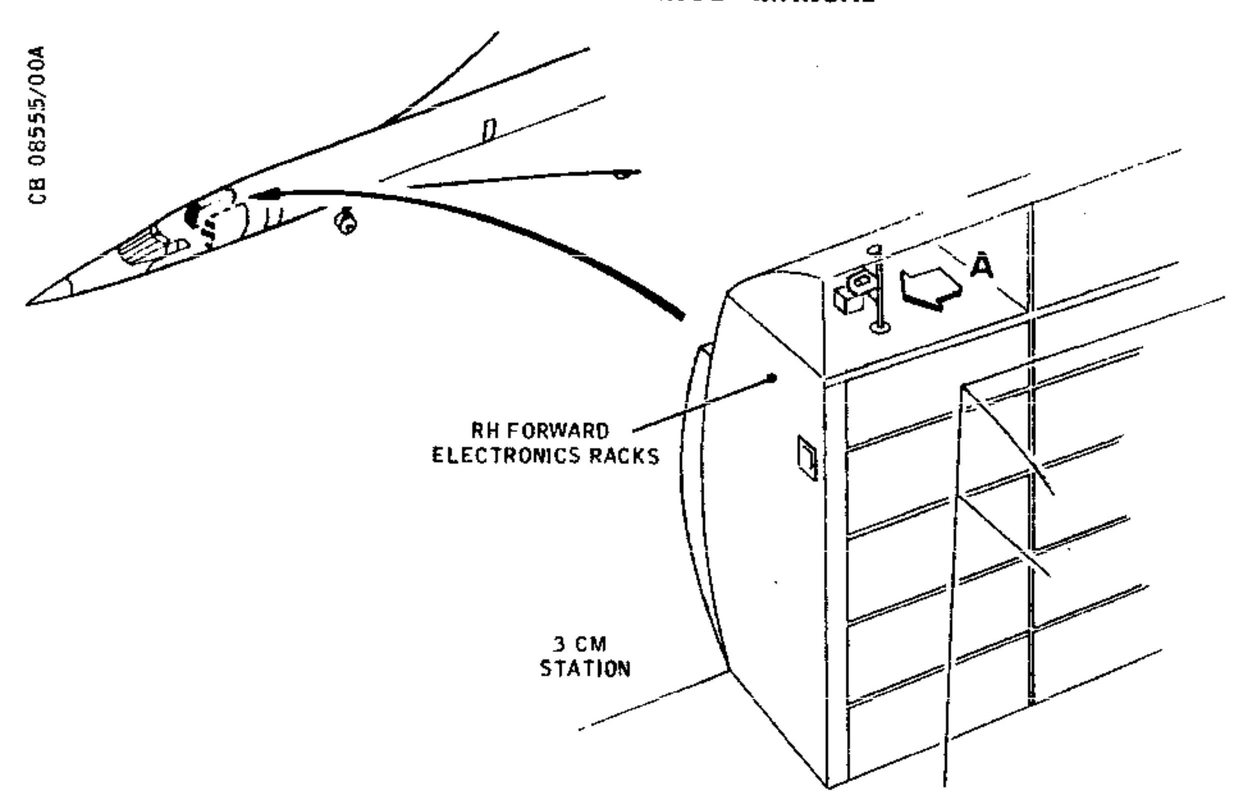
(9) Hold the ground power control switch on panel 3-214 to "CLOSE" and check that ground power is restored. Release the switch.

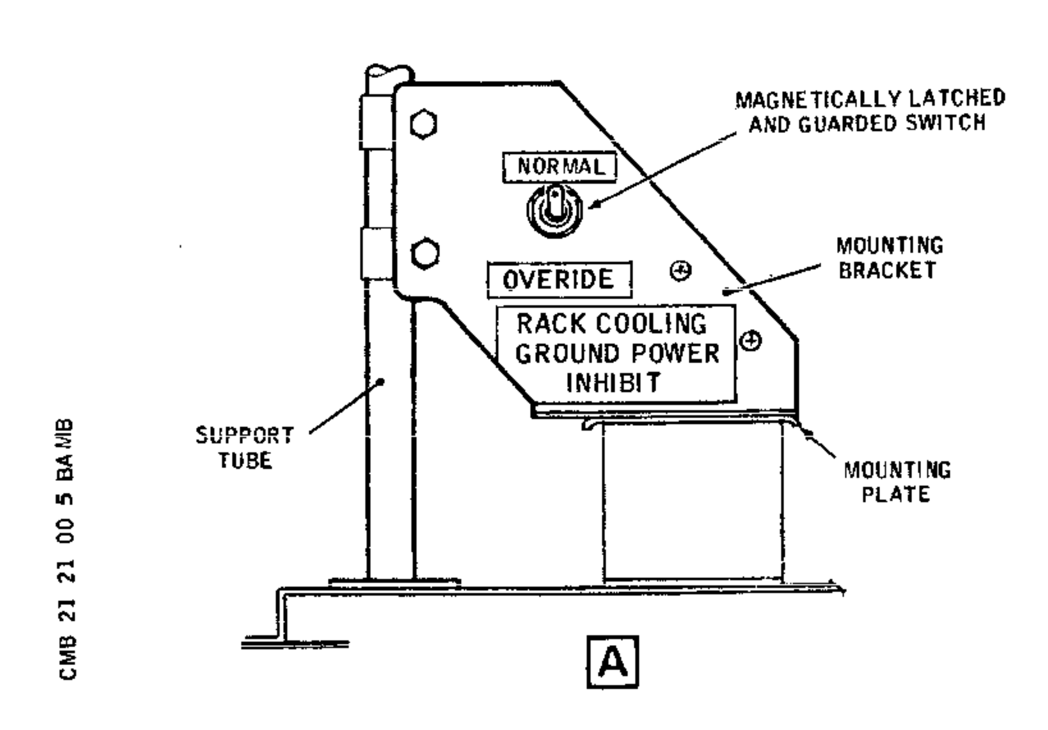
G. Conclusion

(1) Set the CABIN PRESSURE CONTROL DISCHARGE VALVES



INS 2 and Ground Power Control Switches
(Sheet 1 of 2)
Figure 502





INS 2 and Ground Power Control Switches
(Sheet 2 of 2)
Figure 502

open with the switches at NORM.

(2) Switch off and remove the ground electrical supply (Ref. 24-41-00).

(3) Switch off and remove the pre-conditioned air ground supply (Ref. 12-14-21).

(4) Ensure that the switches and indicators on the equipment bay cooling panel (Ref. Fig. 501) are at the normal ground state.

4. Functional Test - System

NOTE: The static pressure requirements of the forward and rear extraction systems are given in Tables 502,503 and 504, which are to be read in conjunction with with Fig.504 505 and 506 respectively.

A good indication of correct flows in a complete forward or rear system is obtained by observing static pressure readings at at least two electronic rack shelves on both sides of the aircraft. In the forward system, mass flow readings may be checked simultaneously on panel 2-214 at the 3CM station. Functional tests of the forward and rear extraction systems are given in detail below.

Other tests may be devised from the information given to prove selected areas where defects are suspected, or after maintenance work.

A. Prepare to Test

(1) Make available electrical ground power (Ref. 24-41-00).

R B

R B (2) Ensure that the switches and indicators on the equipment bay cooling panel are at the normal ground state (Ref. Fig. 501) and para 3.A.(3).

R B (3) Release the quick-release fasteners around the edges of the rack enclosure panels (Ref. Fig.503) of the flight compartment and rear vestibule racks. Remove the panels.

R B (4) Test the FLOW caption filaments by pressing the

filament test push-switches.

R B (5) Set the CABIN PRESSURE CONTROL DISCHARGE VALVES switches on panel 1-214 to "NORM".

B. Forward Supply System Test. (Ref. Fig.501 and 504)

(1) Set the FWD SUPPLY fans switch to NORM and check that the fans run and the magnetic indicators show ON.

(2) Check that the pressure drop across each filter is not more than 7 in water gauge (w.g.).

(3) With both fans running check the static pressure measured at the points shown in Fig.504 and listed in Table 502:

(a) For ident. Nos. 29, 34, 50 the values are to be within ± 10% of the value in the table.

(b) For ident. Nos. 23, 42, 43 the values are to be within the range in the table.

STATIC IDENT NO.	FILTER PRESSURE DROP		STATIC PRESSURE	
	in H20	mm H20	in H20	mm H20
23	3.5	88.9	+0.85 to 1.54	+21.59 to 39.17
	5.0	127	+0.7 to 1.3	+17.78 to 33.02
	7.0	177.8	+0.6 to 1.0	+15.24 to 25.4
29	3.5	88.9	-8.4	-213.36
	5.0	127	-9.0	-228.6
	7.0	177.8	-10.1	-256.54
34	3.5	88.9	-4.7	-119.38
	5.0	127	-3.9	- 99.06
	7.0	177.8	-3.0	- 76.2
42	3.5	88.9	+0.8 to 1.15	+20.32 to 29.21
	5.0	127	+0.6 to 0.9	+15.24 to 22.86
	7.0	177.8	+0.4 to 0.7	+10.16 to 17.78
43	3.5	88.9	-7.6 to -9.0	+193.04 to-228.6
	5.0	127	-8.4 to -10.2	+213.36 to-259.1
	7.0	177.8	-9.6 to -11.0	+243.84 to-279.4
50	3.5	88.9	-4.8	-121.92
	5.0	127	-4.0	-101.6
	7.0	177.8	-3.1	- 78.74

STATIC IDENT NO.	FILTER PRESSURE DROP		STATIC PRESSURE	
	in H2O	mm H2O	in H2O	mm H2O
	3.5	88.9	+0.85 to 1.54	+21.59 to 39.17

NOTE: Static Pressures are given with 2 fans operating at Sea Level and 15°C conditions. For other conditions of atmospheric pressure P (psia) and temperature T (deg C) factor by:

$$\frac{P}{14.7} \times \frac{288}{T+273}$$

Static Pressure Requirements - Forward Rack Supply Table 502

Ident No.	Static Pressure in H2O-ve/mm H2O-ve (1)	(2)	(3)
61	- -	0.23 7.1	- -
62	3.24 82.0	2.23 56.64	- -
63	3.71 94.5	2.60 66.04	- -
65	1.85 to 2.3 47.0 to 58.5	1.3 to 1.6 33.02 to 40.64	
66	1.0 to 1.25 25.4 to 31.8	0.7 to 0.89 17.78 22.61	
67	3.90 99.0	2.73 69.34	- -
68	2.28 to 2.80 58.0 to 71.12	1.6 to 1.96 40.64 to 49.78	1.5to 1.85 38.0 48.3
76	2.94	2.06	1.93

Ident No.	Static Pressure in H2O-ve/mm H2O-ve (1)	(2)	(3)
69	2.28 to 2.88 58.0 to 73.5	1.6 to 2.02 40.64 to 51.31	1.5to 1.85 38.0to 48.3
70	2.4 to 3.05 60.96 to 77.47	1.45 to 1.8 36.83 to 45.72	1.67 42.6
71	2.8 to 3.5 77.12 to 88.9	1.7 to 1.77 43.18 to 44.96	1.87 48.0
72	2.90 73.5	2.03 52.62	1.90 48.3
73	3.02 77.0	2.12 53.85	1.98 50.4
74	3.02 77.0	2.12 53.85	1.98 50.4
75	2.92 73.5	2.04 51.81	1.91 46.9
98	2.5 to	1.75 to	

Ident No.	Static Pressure in H2O-ve/mm H2O-ve		
	(1)	(2)	(3)
	75.0	52.32	49.0
78	2.8 to 3.6 71.12 to 91.44	1.96 to 2.52 48.48 to 64.00	1.98 50.4
82	6.10 155.0	3.90 99.06	- -
85	8.00 204.0	5.00 127.0	- -
86	+2.90 +73.5		- -
87	+3.0 +77.5	+18.6 +47.5	- -
90	4.1 104.0	2.65 69.31	- -
93	2.83 72.0	1.98 50.29	1.86 47.2
95	3.07 78.0	1.9 48.5	2.02 52.0
96	2.56	1.8	1.78

Ident No.	Static Pressure in H2O-ve/mm H2O-ve		
	(1)	(2)	(3)
	2.9 63.5 to 73.66	2.03 44.45 to 51.56	1.73 44.2
99	2.60 67.5	1.86 47.24	1.73 44.2
100	1.9 to 2.4 48.26 to 60.96	1.15 to 1.45 29.21 to 36.83	1.34 35.4
101	1.65 to 2.35 42.0 to	1.16 to 1.65 29.46 to	1.04to 1.54 27.5 to
102	2.05 51.0	1.44 36.57	1.34 33.4
103	2.12 54.0	1.48 37.59	1.39 35.4
104	3.43 87.0	2.40 60.96	-
105	1.06 26.92	- -	- -
108	2.2 56.0	1.33 34.8	- -
109	0.2 to		

Ident No.	Static Pressure in H2O-ve/mm H2O-ve			Ident No.	Static Pressure in H2O-ve/mm H2O-ve		
	(1)	(2)	(3)		(1)	(2)	(3)
	65.8	85.72	43.0		0.41 5.08 to 10.14	- -	- -
97	2.57 65.28	1.81 45.97	1.80 96.2	110	1.33 35.8	0.93 23.62	 -

NOTES

1) The above statics are given at Sea Level and 15 deg C conditions. For other conditions of atmospheric pressure P (psia) and temperature T (deg C) factor by:
For columns (1), (2) -

$$\frac{P}{14.7} \times \frac{288}{T+273}$$

For columns (3) -

$$\frac{14.7}{P} \times \frac{T+273}{288}$$

2) Statics in column (1) are quoted for two Fwd Rack Extract Fan operating with both forward discharge valves open.

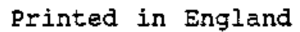
3) Statics in column (2) are quoted for two Fwd Rack Extract Fans operating with both fwd discharge valves closed.

4) Statics in column (3) are quoted for 0.875 kg/sec extract via fwd discharge valves with fans inoperative. For other values of W, factor by:

$$\left(\frac{W}{0.875}\right)2$$

Static Pressure Requirements - Forward Rack Extraction Table 503

IDENT No.	Static Pressure in H20-ve/mm H20-ve Col. 1 2-Fans, Normal	 Col.2 Stand-by Fan
110	5.0 127.0	1.99 50.54
111	3.6 91.4	1.35 34.29
113	3.5 88.9	1.10 27.94
114	3.5 to 4.2 88.9 to 106.7	1.42 36.07
115	7.1 180.3	2.72 69.09
117	11.5 292.1	3.74 95.0
119	8.0 203.2	- -
120	4.3 109.2	1.71 43.43
121	3.0 to 3.7 76.8 to 94.0	1.26 to 1.56 32.0 to 39.62
122	6.0	2.35



IDENT No.	Static Pressure in H2O-ve/mm H2O-ve Col. 1 2-Fans, Normal	Col.2 Stand-by Fan
	152.4	59.69
123	4.5 114.3	2.27 57.66
124	5.6 142.2	2.27 57.66
125	10.0 254.0	4.3 109.22

NOTES

1) The above statics are given at Sea Level and 15 deg C conditions. For other conditions of atmospheric pressure P (psia) and temperature T (deg C) factor by:

$$\frac{P}{14.7} \times \frac{288}{T+273}$$

2) Statics in column (1) are quoted for two normal rear rack extract fans operating with HF boxes fitted but not powered.

5) Statics in column (2) are quoted for Standby Fan only.

Static Pressure Requirements - Rear Rack Extraction Table 504

R B C. Forward Extraction System Test (Ref. Fig.501, 503
R B and 505).

(1) Remove the rubber blanking cap from the static-pressure test pipe on one shelf in the flight compartment electronic racks (Ref. Fig. 503) and connect a water manometer. Check that the manometer

R B registers within ± 10 per cent of the figures given in Table 503, Column (1). Check each shelf in turn on both sides of the aircraft refitting each blanking cap before proceeding to the next shelf.

(2) Check that the mass flow indicator shows 0.85 - 1.1 kg/s.

R B (3) Switch off the FANS 1 & 3 and switch on the FAN 2. Check that the manometer reading for the same shelves is within ± 10 per cent of the figures given in Table 503, Column (1), multiplied by a factor of 0.36.

(4) Switch off FAN 2 and switch FANS 1 & 3.

R B (5) Repeat the above tests with both forward discharge valves closed and check that the manometer registers within 10 per cent of the figures given in Table 503, Column(2). This test is a check of outward relief valve operation.

(6) Switch the EMERG RELIEF valve to "OPEN". Check that the associated magnetic indicator shows "OPEN". Switch the valve to "SHUT" and check that the magnetic indicator shows "SHUT".

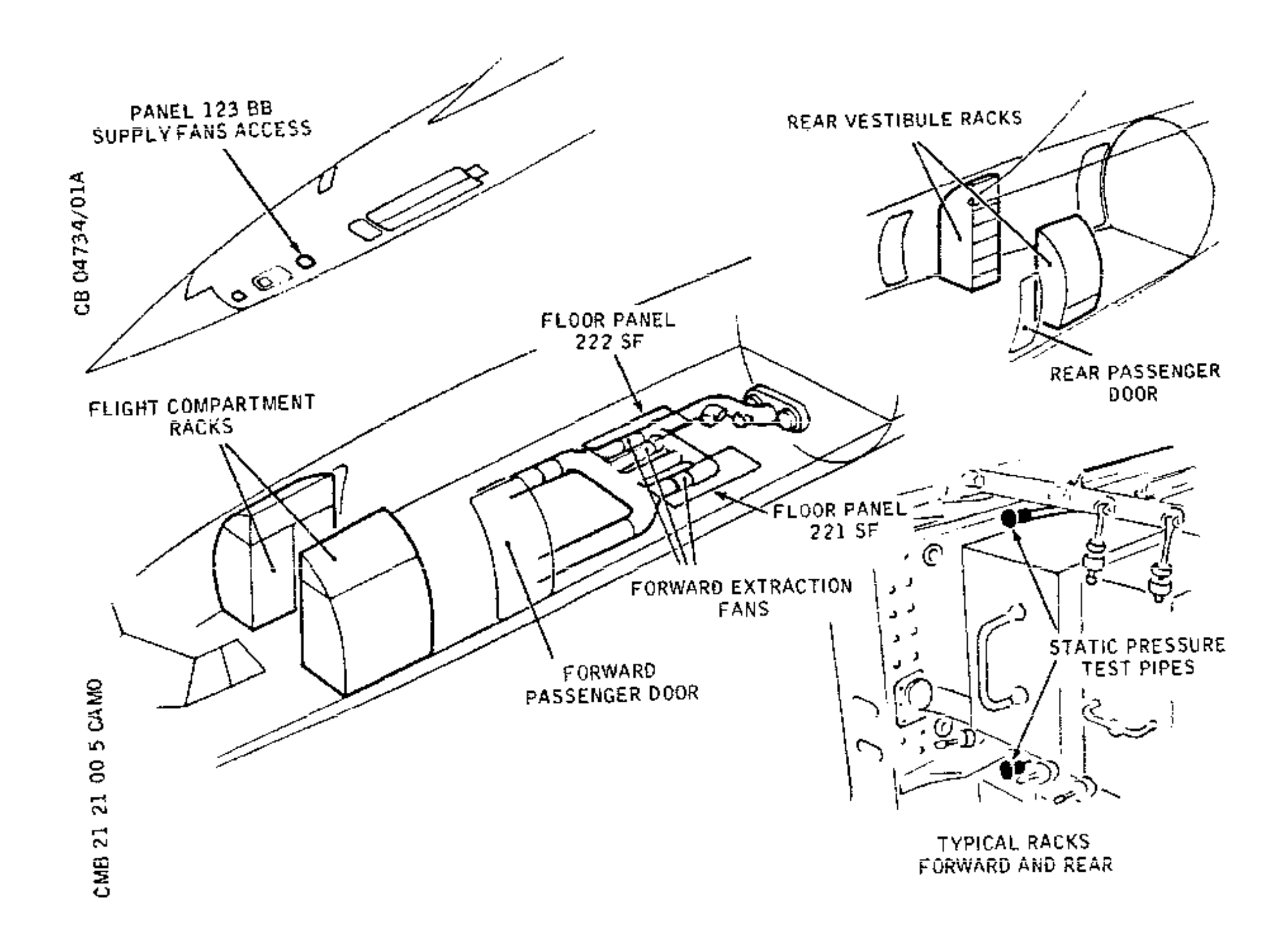
(7) Remove the manometer and check that all blanking caps are in place.

(8) Reset the forward discharge valves to NORM and check that there is an efflux of air from the cabin pressure regulating discharge valves.

R B

D. Rear Extract System (Ref. Fig.501, 503 and 506)

(1) Remove the rubber blanking cap from the static pressure test pipe on one shelf in the rear vestibule racks and connect the water manometer to the test pipe. Check that the manometer registers within ± 10 per cent of the figures given in Table 504, Column (1). Check each shelf in turn on both sides of the aircraft, refitting each blank-



Air Extraction - Test Connections and
Access Panels
Figure 503

ing cap before proceeding to the next shelf. Leave the manometer connected to one test point.

(2) Repeat the tests using the standby fan only and check the manometer registers within ± 10 per cent of the figures given in Table 504, Column (2).

(3) Disconnect the manometer and fit the rubber blanking cap to the shelf test pipe.

E. Conclusion

(1) Ensure that the switches and indicators on the equipment bay cooling panel (Ref. Fig. 501) are at the normal ground state.

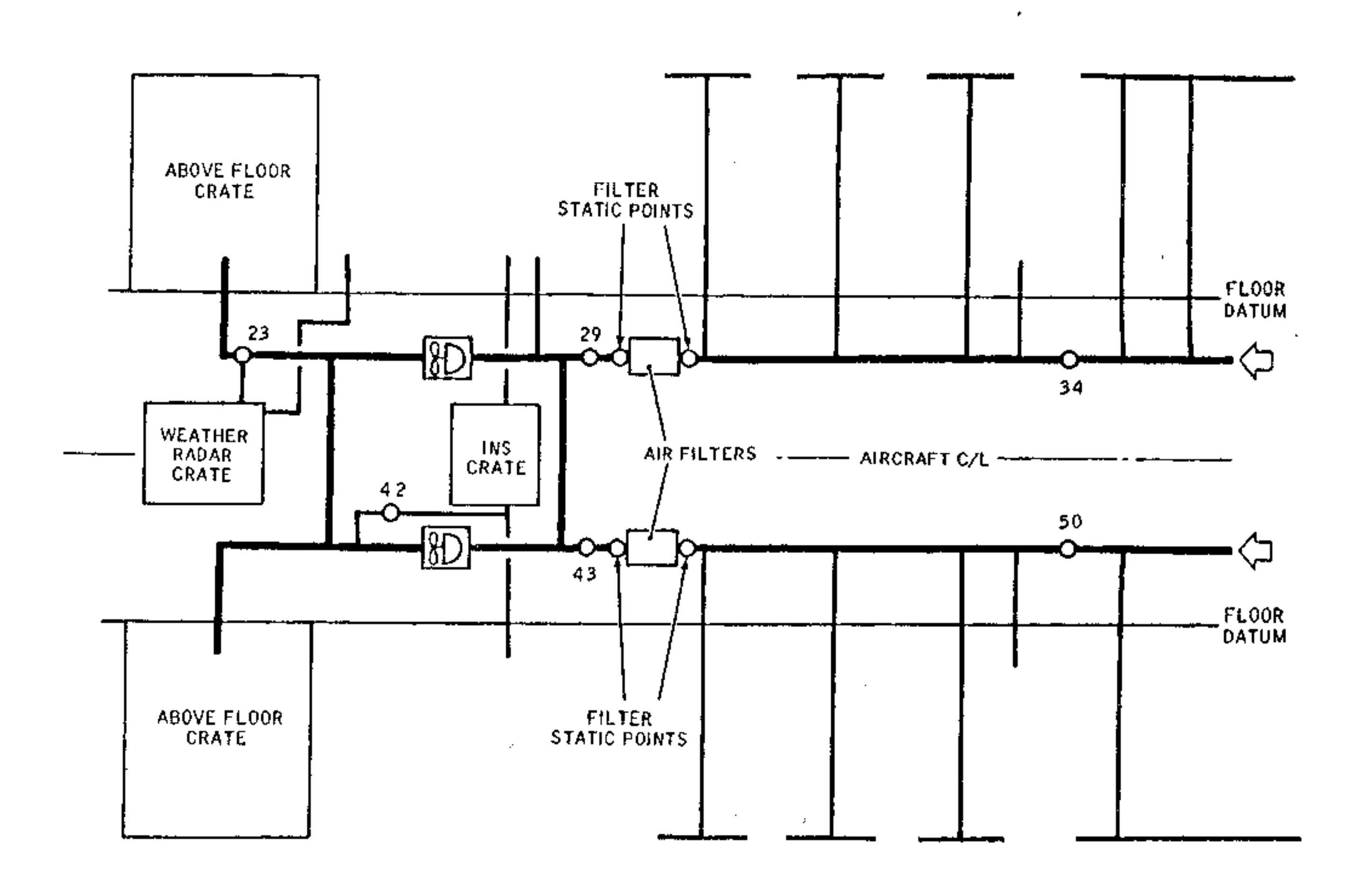
(2) Switch off and remove electrical ground power supply (Ref. 24-41-00).

(3) Switch off and remove the pre-conditioned air ground supply (Ref. 12-14-21).

R B

(3) Fit the flight compartment and rear vestibule rack enclosure panels.

(4) Fit access panels.



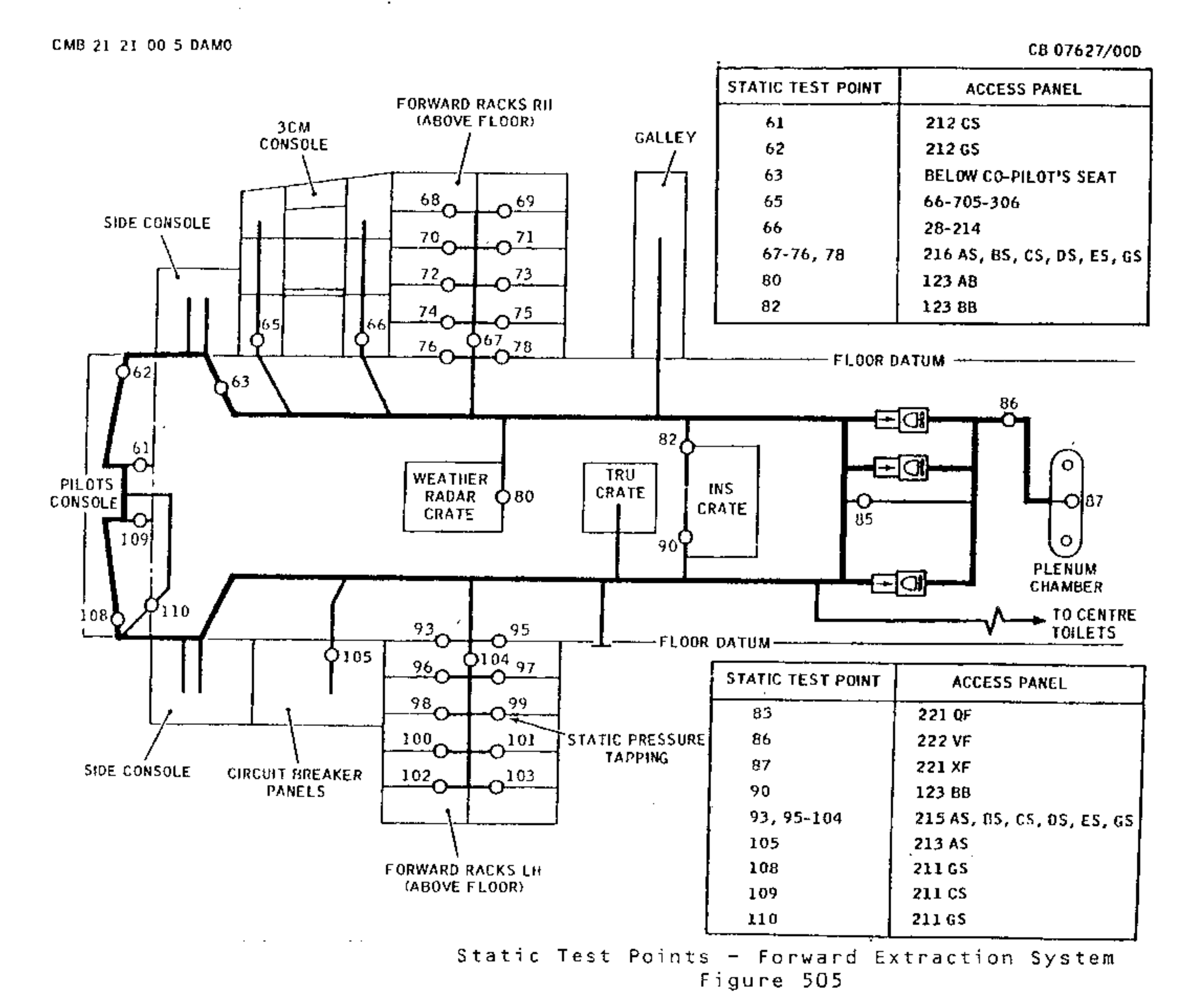
Static Test Points - Forward Rack Supply
Figure 504

EFFECTIVITY: ALL

R

BA

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STATIC TEST POINT	ACCESS PANEL
61	212 CS
62	212 GS
63	BELOW CO-PILOT'S SEAT
65	66-705-306
66	28-214
67-76, 78	216 AS, BS, CS, DS, ES, GS
80	123 AB
82	123 BB

STATIC TEST POINT	ACCESS PANEL
83	221 QF
86	222 VF
87	221 XF
90	123 BB
93, 95-104	215 AS, BS, CS, DS, ES, GS
105	213 AS
108	211 GS
109	211 CS
110	211 GS

Static Test Points - Forward Extraction System
Figure 505

Test Point	Access	Test Point	Access
110	On shelf 01-244	119	On shelf 06-243
111	On shelf 02-244	120	On shelf 05-243
112	On shelf 03-244	121	On shelf 04-243
113	On shelf 04-244	122	On shelf 03-243
114	On shelf 05-244	123	On shelf 02-243
115	On shelf 06-244	124	On shelf 01-243
117	Panel 243-DF	125	On shelf 06-243

Static Test Points - Rear Extraction System
Figure 506

AIR EXTRACTION - INSPECTION/CHECK

1. General

There are a number of wire mesh debris guards in the air extraction systems which must be free from fluff and tacky deposit.

2. Transformer Rectifier Unit (TRU) Ventilation Debris Guards

A. Prepare

(1) Electrically isolate the TRU's by tripping the following circuit breakers:-

R

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
R	TRU.1	2-213	1P1	B20
R	TRU.2	21-215	2P1	-
R	TRU.3	21-216	3P1	-
R	TRU.4	4-213	4P1	F14

R

(2) Remove access panel 123 AB immediately forward at the TRU rack in the forward equipment bay. The two cooling air uptakes and guards are visible between the four TRU's.

B. Inspect.

(1) Inspect the debris guards and check that they are clean.

C. Conclusion.

(1) Refit access panel 123 AB.

(2) Reset the circuit breakers previously tripped.

3. Forward Extraction Ducting Debris Guards

CAUTION: BEFORE OPENING ANY AIR EXTRACTION DUCTING DISCONNECT ALL ELECTRICAL POWER. THIS IS TO SAFEGUARD ELECTRONIC EQUIPMENT WHILE THE COOLING AIR SYSTEM IS INOPERABLE. DO NOT APPLY WEIGHT TO DUCTING.

A. Prepare.

(1) Check that electrical power is disconnected.

R (2) Gain access to the three fan debris guards by removing
R floor panels 222 SF and 221 SF.

(3) Remove the debris guard sections of ducting as detailed in 21-21-00, Removal/Installation.

B. Inspect.

(1) Inspect the debris guards and check that they are clean.

C. Conclusion.

(1) Refit the debris guards as detailed in 21-21-00, Removal/Installation.

(2) Restore the electrical power supply.

(3) Check that the discharge value switches on CABIN PRESSURE CONTROL panel 1-214 are at NORMAL and that the valve position indicators show OPEN.

(4) Check that the switches and indicators on the EQUIPMENT BAY COOLING panel section of panel 2-214 are at the normal ground state.

(5) Refit floor panels 221 SF and 222 SF. Torque tighten the countersink securing bolts to
R 20-25 lbf/in (0.22-0.28 mdaN).

R (6) Restore the furnishings to their original position.

4. <u>Inward Relief Valve (IRV) and By-Pass Valve (BPV) Debris Guards</u>

A. Prepare.

(1) Move the furnishings as required to expose floor pane1 222 VF.

(2) Remove the floor panel 222 VF for access to IRV debris guard and lower baggage compartment panel 131 AS for access to the BPV debris guard.

B. Inspect.

(1) Inspect the debris guards and check that they are clean.

C. Conclusion.

(1) Refit the access panels and torque tighten the floor panel securing screws to between 20 and 25 lbf/in (0.22 and 0.28 mdaN).

(2) Restore the furnishing to their original position.

5. Rear Extraction Fan Debris Guards

A. Prepare.

(1) Move the furnishing as required to expose floor panels 243 DF and 243 GF.

(2) Remove floor panel 213 DF for access to the main rear extraction fans and floor panel 243 GF for access to the standby fan.

B. Inspect.

(1) Inspect the debris guards and check that they are clean.

C. Conclusion.

(1) Replace floor panels 243 DF and 243 GF and torque tighten the countersink securing bolts to between 20 and 25 lbf/in (0.22 and 0.28 mdaN).

(2) Restore the furnishings to their normal position.

AIR EXTRACTION - CLEANING/PAINTING

1. General

Cleaning of the air extraction system consists of cleaning of debris guards in the ducting and ensuring that the cooling holes in the forward electronic racks are unobstructed.

2. Cleaning Debris Guards

(1) Remove the loose material by tapping and dry brushing the wire mesh.

(2) Thoroughly clean by brushing with general purpose cleaning solvent methylethylketone (MEK).

(3) Dry with clean dry compressed air.

3. Cleaning Cooling Holes in Forward Electronic Racks

(1) Remove the forward electronic rack sealing panels (Ref. 25-71-00, Removal/Installation).

**ON A/C 006-007,

(2) Using a vacuum cleaner, flexible hose and adapter, (Ref. Fig. 701), clean between each adjacent pair of runner angles on the forward electronic rack shelves (Ref. Fig. 702) and on top of each end seal member at the positions indicated (Ref. Fig. 703).

(3) Refit the forward electronic rack sealing panels.

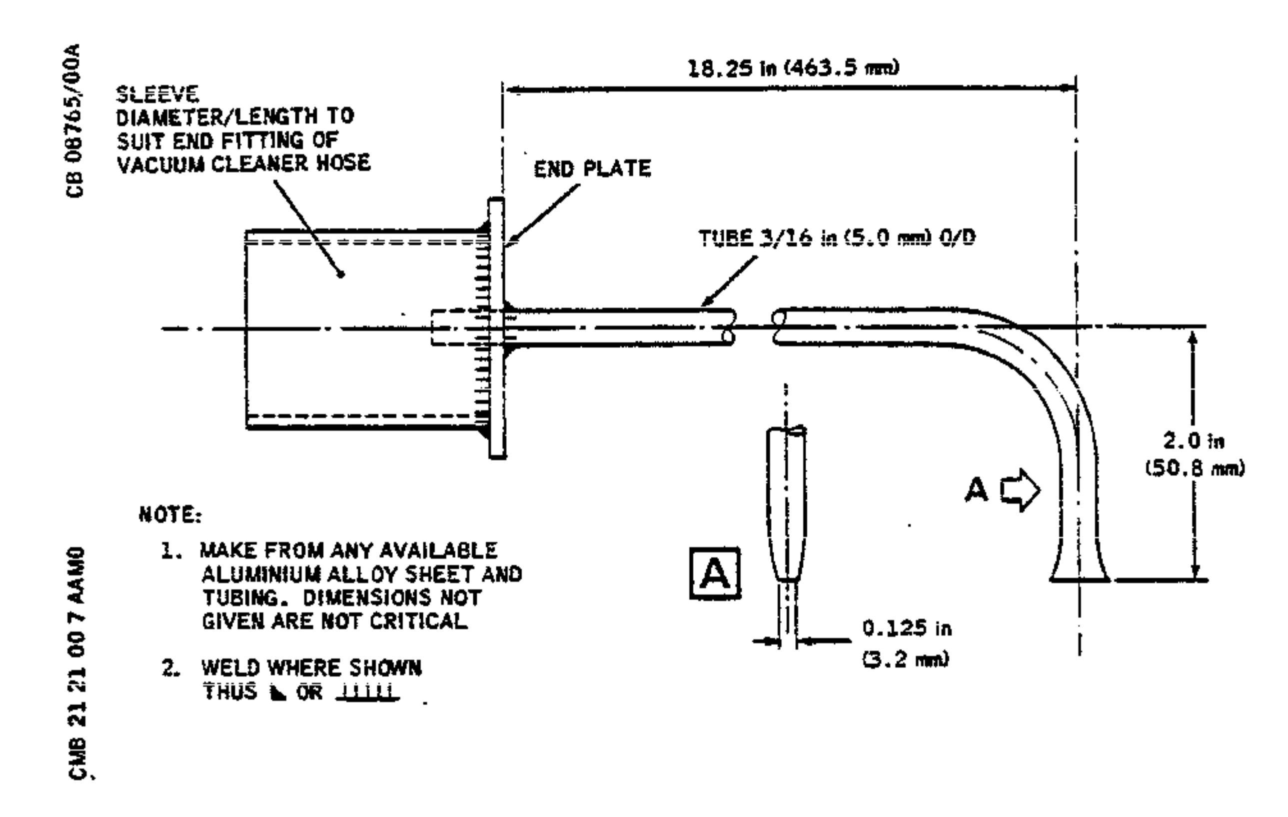
**ON A/C 001-002,

(2) Using a vacuum cleaner, flexible hose and adapter, (Ref. Fig. 701), clean between each adjacent pair of runner angles on the forward electronic rack shelves (Ref. Fig. 702) and on top of each end seal member at the positions indicated (Ref. Fig. 704).

(3) Refit the forward electronic rack sealing panels.

**ON A/C 003-005,

(2) Using a vacuum cleaner, flexible hose and adapter, (Ref. Fig. 701), clean between each adjacent pair of runner angles on the forward electronic rack shelves (Ref. Fig. 702) and on top of each end seal member at the positions indicated (Ref. Fig. 705).



Vacuum Cleaner Adapter
Figure 701

(3) Refit the forward electronic rack sealing panels.

R B 4. Cleaning Cabin Air Extraction Ducting

R B A. In passenger cabin, remove cabin ceiling trim between
R B frames 20 and 66 to expose air extraction ducting above
R B side light fittings RH and LH.

R B B. Clean dirt from exhaust holes.

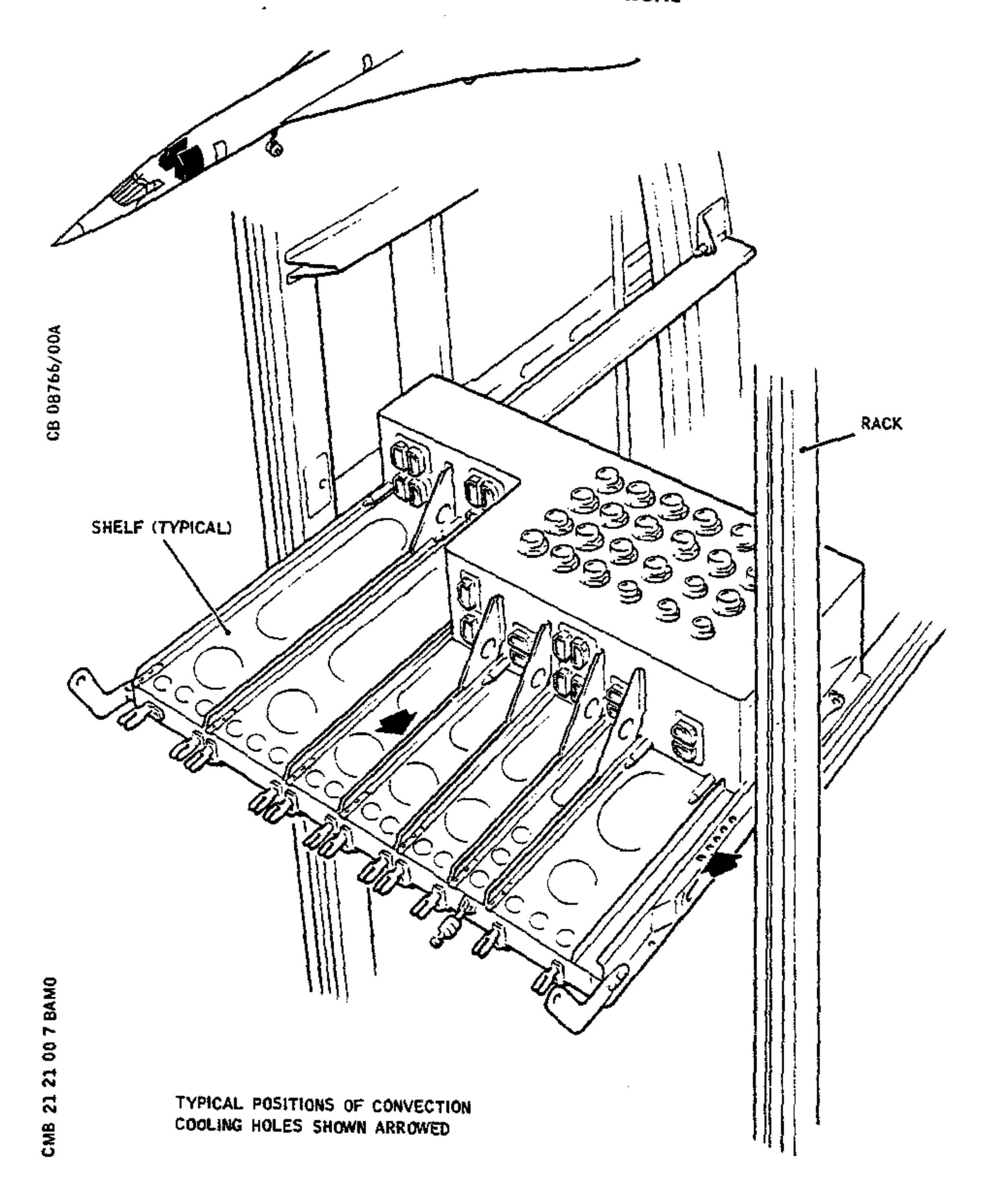
R B C. Remove rubber sleeves from duct bridging sections and clean
R B inside of extraction duct with flue brush and vacuum
R B nozzle.

R B D. Reconnect sleeves.

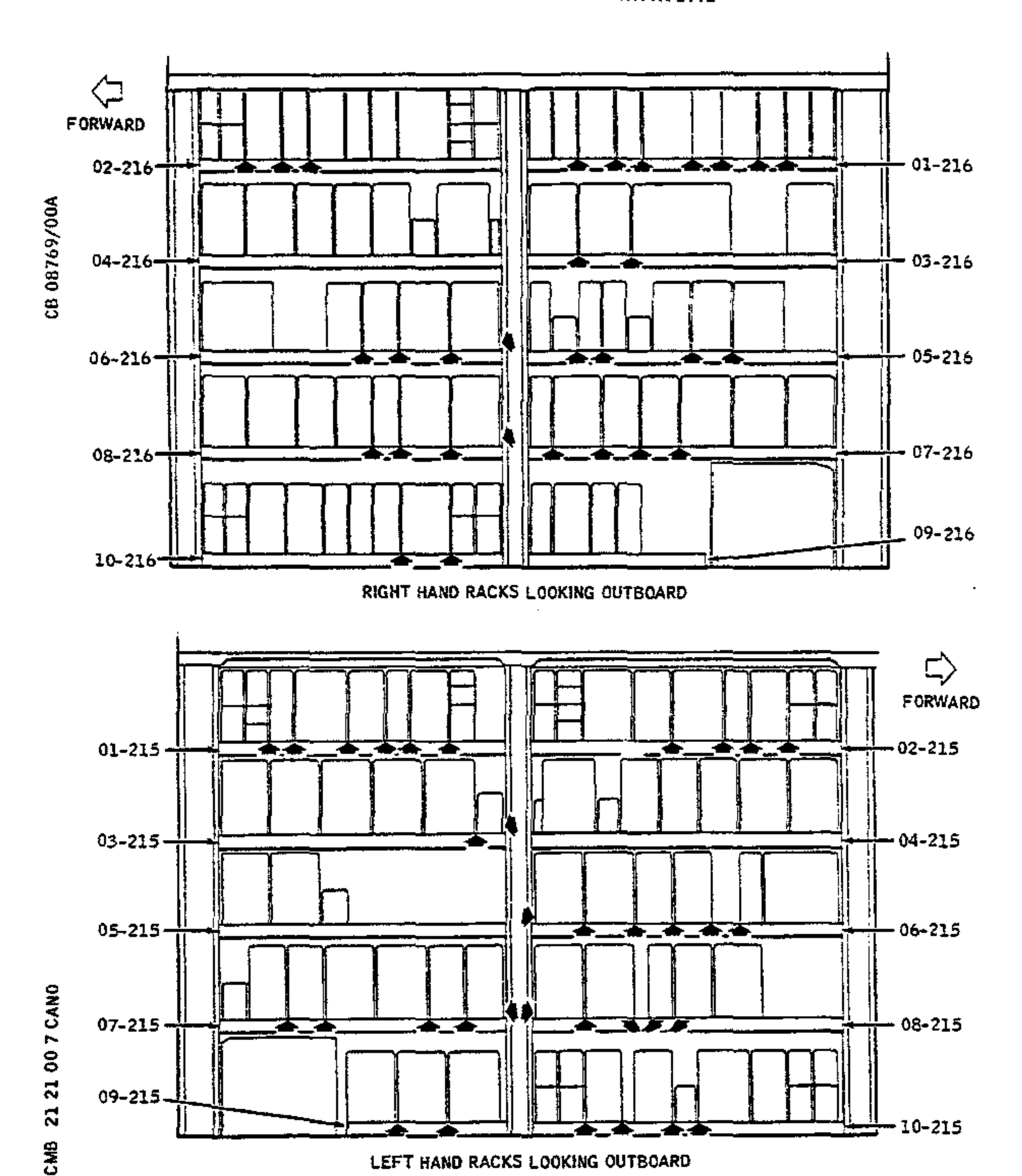
R B E. Fit fine gauze or cheesecloth across inlet (rear end) of
R B recirculation air duct filters, RH and LH (see 21-21-29)
R B and run fwd supply fans for 15 mins.

R B F. Switch off fans, remove gauze and dirt from filter inlet,
R B reconnect ducts.

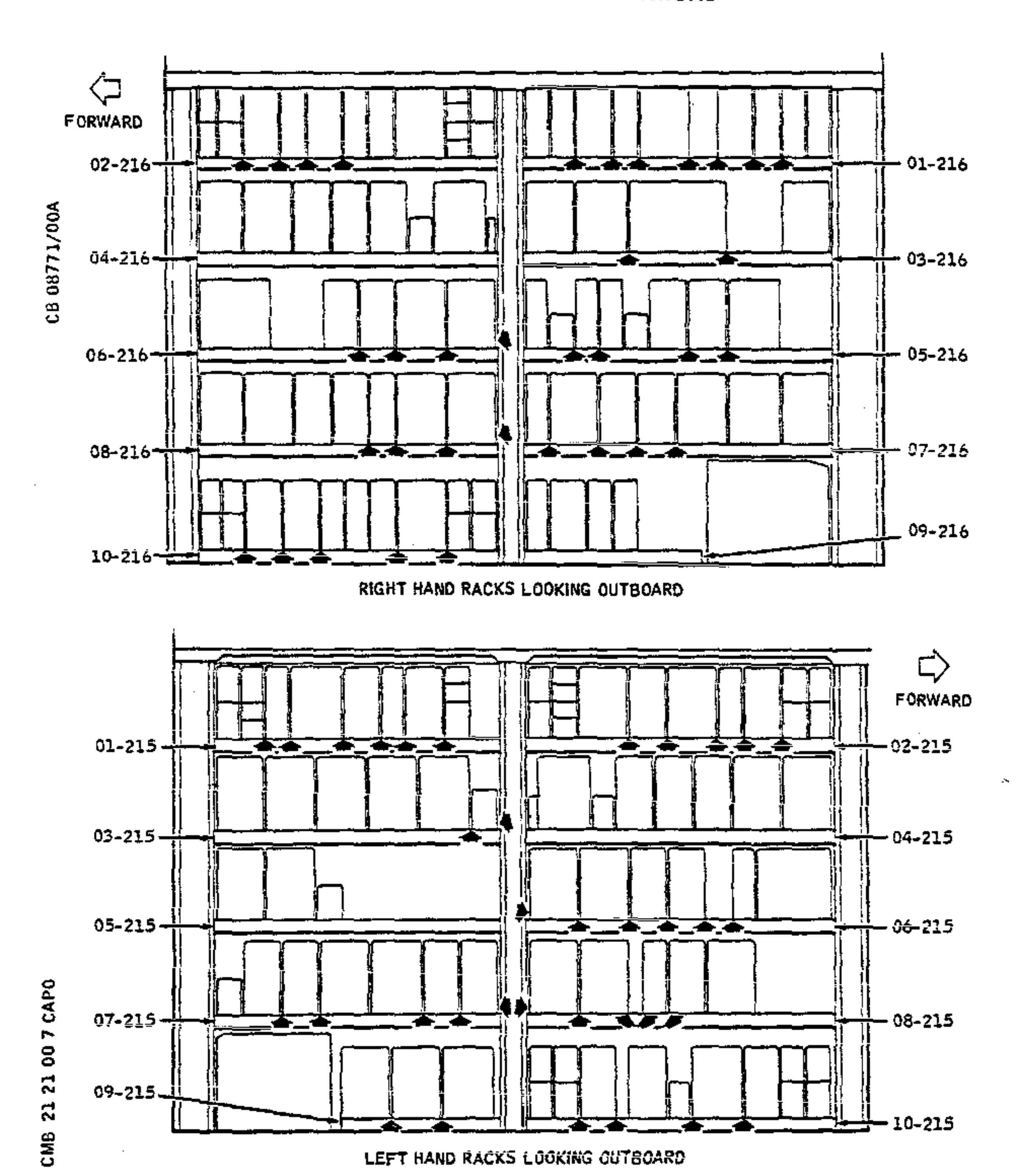
R B G. Replace cabin trim.



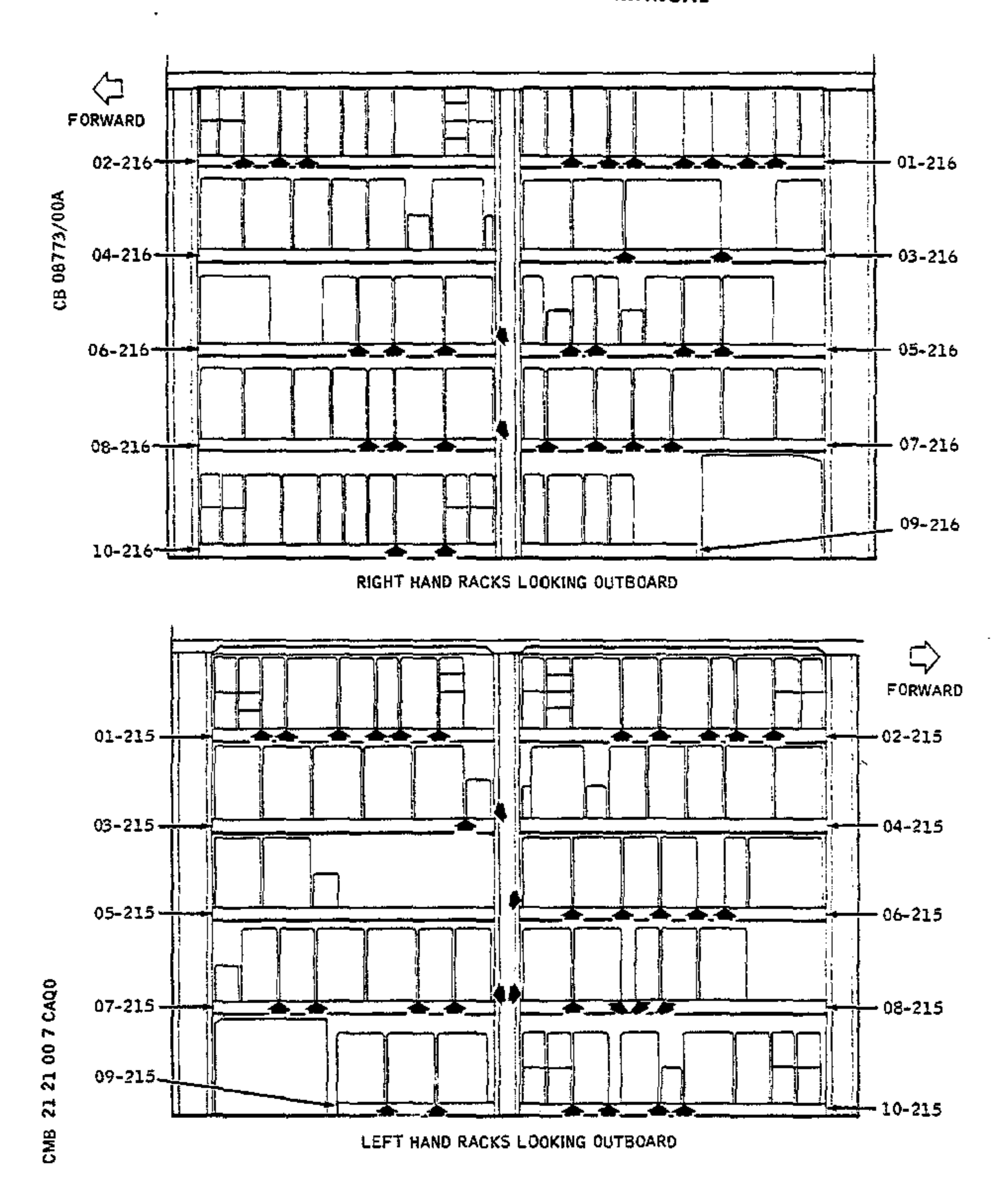
R Typical Position of Convection Cooling Holes
Figure 702



Forward Electronic Racks - Positions for Vacuum Cleaning Application
Figure 703



Forward Electronic Racks - Positions for Vacuum Cleaning Application
Figure 704



Forward Electronic Racks - Positions for
Vacuum Cleaning Application
Figure 705

AIR EXTRACTION DUCTS - APPROVED REPAIRS

1. General

Equipment rack air extraction ducting must be pressure tested after repair, therefore, it is recommended that these ducts are removed for repair and testing. This means that the aircraft electrics and the rack air extraction must not be operated. The ducting is resin bonded glass fibre, which is repaired with a Versamid Bakelite/Ciba adhesive.

2. Tools and Equipment Required

	DESCRIPTION	PART NO.
	Cleaning solvent - for local cleaning of repair area	-
R R	General purpose cleaning solvent (Ref.20-30-00, No.470)	Methyl-ethyl-ketone (MEK)
	Garnet paper (100 grade)	-
R R	Adhesive compound (Ref.20-30-00, No.303)	Bakelite 18774/1
R R	Adhesive compound (Ref.20-30-00, No.305)	Versamid 140
R R	Adhesive compound (Ref.20-30-00, No.304)	Ciba AY 105
R R	Adhesive compound (Ref.20-30-00, No.350)	Aerosil
R	Glass cloth (0.006 in - 0.152 mm) (Ref.20-30-00, No.A219)	BS3396-3-P6/22
R	Glass cloth (0.003 in - 0.076 mm) (Ref.20-30-00, No.A220)	BS3396-3-P3/11
R	Glass tape (0.007 in - 0.177 mm) (Ref.20-30-00, No.A221)	DTD5546-NF-P32 225-225E
R R	Glass fibre (0.0937 in dia - 2.382 mm dia) (Ref.20-30-00, No.A222)	BS3691 type 3
R R	Applicator or Brush for applying adhesive	-

3. Duct Repair (Ref. Fig.801 and 802)

A. Prepare to Repair

(1) Remove the damaged duct (Ref. 21-21-00), Removal/ Installation).

(2) Remove all loose and broken material from the damaged area of the duct; dress out holes to a regular shape and radius corners, removing the minimum amount of material.

(3) Pretreat the surface to be repaired:

(a) Clean the surfaces to be treated by wiping them with a clean paper tissue moistened with solvent, then wipe the surfaces dry with a clean, dry tissue.

R (b) Dry abrade the surfaces that will be covered by repair material, using garnet paper to provide a fine matt finish.

R (c) Remove all debris from the surface with a vacuum cleaner.

R (d) Thoroughly clean the pretreated surface with a clean tissue moistened with solvent, and wipe dry with a clean, dry tissue.

B. Repair (Versamid normal mix)

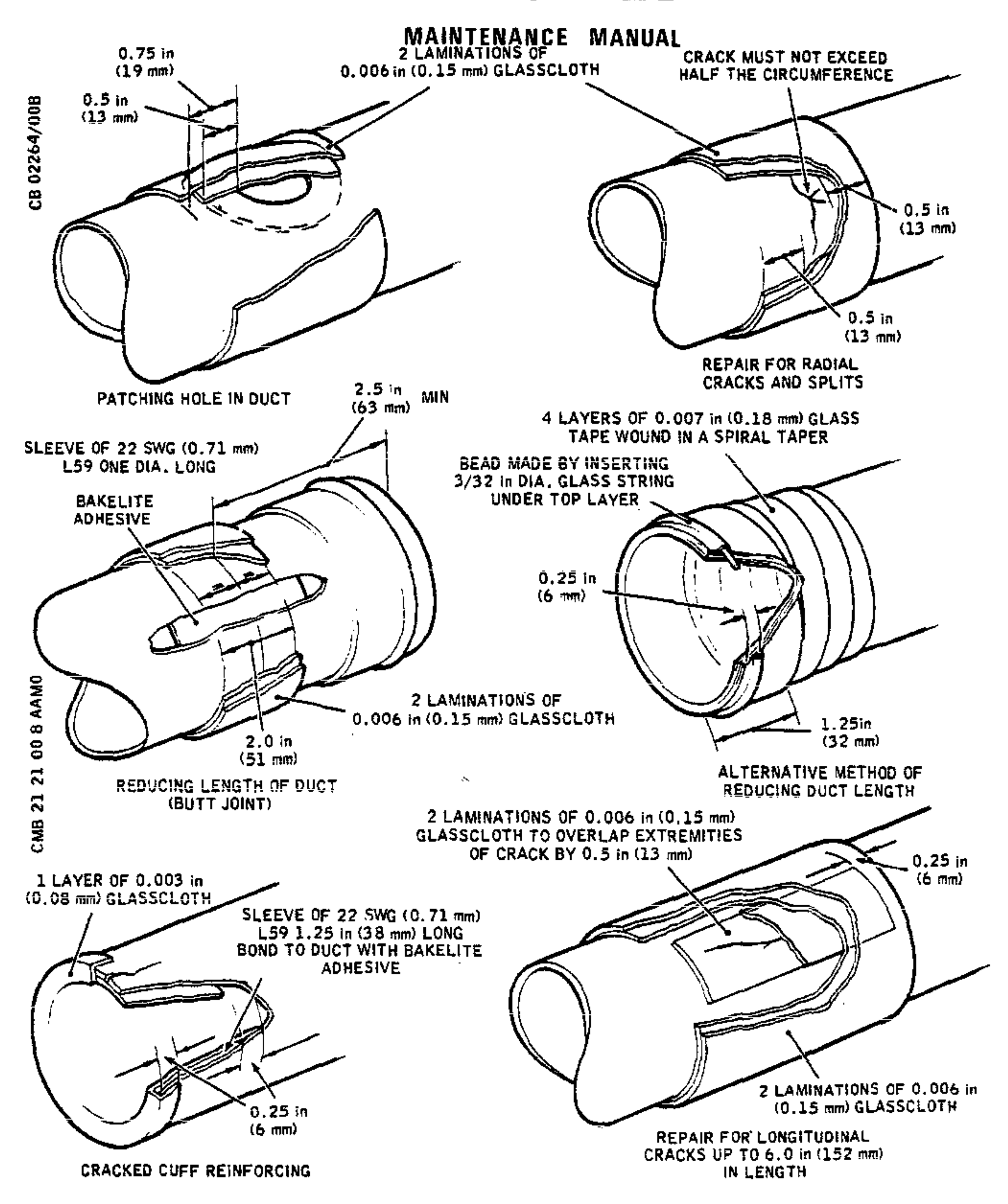
CAUTION: REPAIRS MUST BE DONE WITHIN TWO HOURS OF THE DUCT BEING PRETREATED.

R R NOTE: Where two horizontal and relatively smooth surfaces are to be joined, use a normal mix. To eliminate the mixture draining off under other conditions, use a thixotropic mix.

(1) Repair the ducts in accordance with the appropriate detail of Figure 801, mixing and applying the Bakelite adhesive as follows:

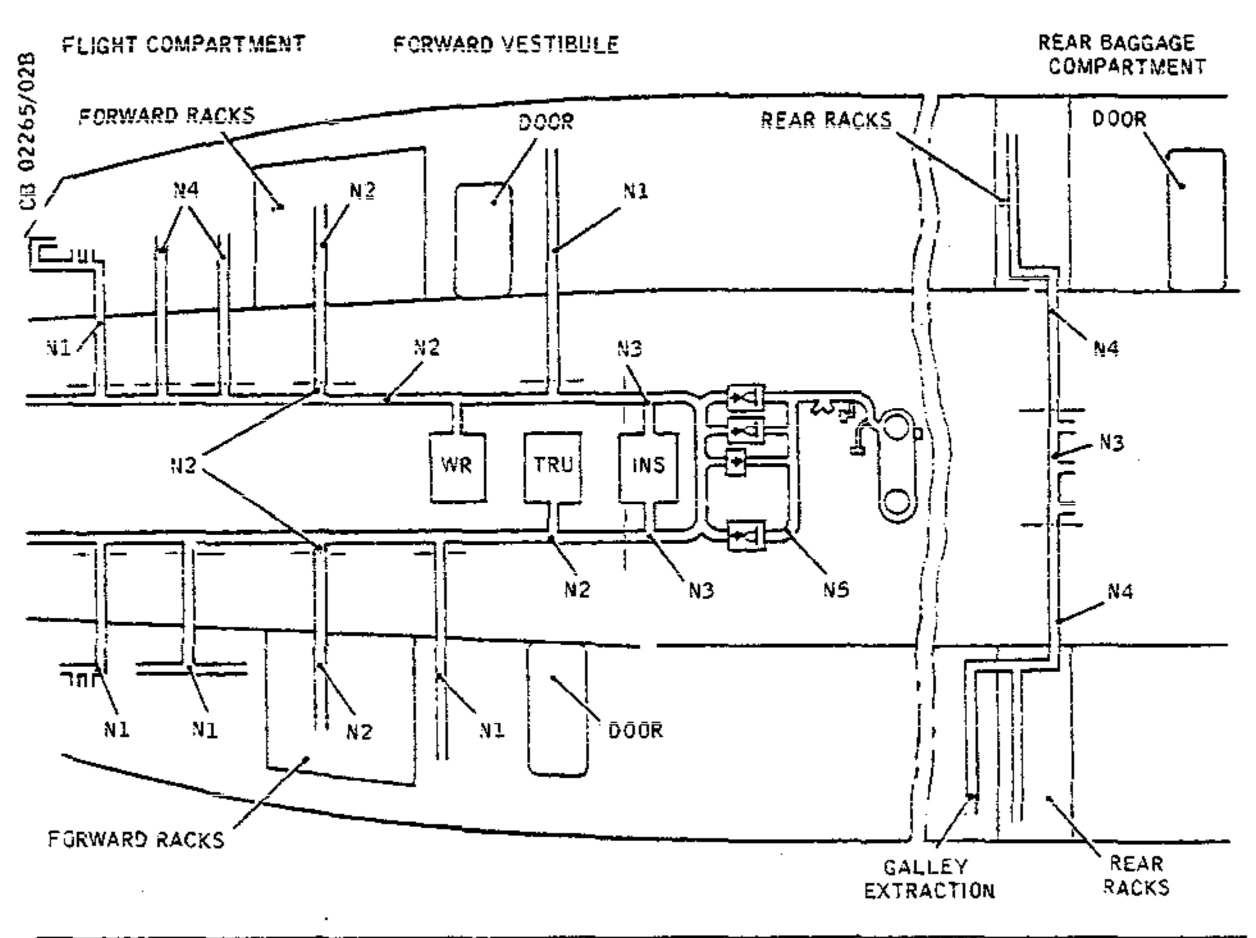
(a) Add 30 parts (by weight) of Versamid 140 to 70 parts (by weight) of Bakelite 18774/1, or Ciba AY105, and mix thoroughly.

(b) After mixing, allow the adhesive to stand for a minimum of 10 minutes prior to application.



Duct Repairs - General
Figure 801

R



DUCT	STANDARD TEST PRESSURE (EXTERNAL)		LEAK TEST PRESSURE (INTERNAL)	LEAK RATE
N1	5.8 in H_2O	AMBIENT	3.0 in H_2O	MUST NOT EXCEED 0.05 ft^3/min/ft RUN
N2	22.5 in. H_2O		10.0 in. H_2O	
N3	33.8 in. H_2O		15.0 in. H_2O	
N4	18.0 in. H_2O		7.5 in. H_2O	
N5	60.0 in. H_2O		30.0 in. H_2O	

NOTE:
LEAK TEST WITH INTERNAL PRESSURE AT ROOM TEMPERATURE

CMB 21 21 00 8 BAM0

R

Duct Classification and Test Pressures
Figure 802

NOTE: The pot life of the mixture is about 2 hours at normal shop temperature (18-25 deg C).

R (c) Apply the adhesive at approximately 1/4 oz/sq ft
R (700 g/sq m) and spread it evenly on each surface to be bonded using a suitable applicator
R or a fletch brush.

(d) Immediately after applying the adhesive bring the bonding surfaces together, and retain them in position; whenever possible apply an evenly distributed pressure of between 5 and 15 psi (0.35 - 1.05 bar).

NOTE: It is imperative to retain the original internal shape of the duct.

(e) Allow the adhesive to gel prior to applying heat.

(f) Cure the assembly in accordance with the following:

CURE TIME	GLUE LINE TEMPERATURE
24 hours	Shop temperature *
8 hours	30-40 deg C
3-4 hours	65-70 deg C
1-2 hours	110-120 deg C

*NOTE: For joints cured at shop temperature a post cure of 3 hours at between 65 and 70 deg C must be applied wherever practicable in order to develop maximum joint strength. No pressure is required
R during the post cure period.

Curing Time
Table 801

(2) Thixotropic Mix modified by Aerosil.

(a) Take 4 parts (by weight) of Aerosil, dried in an air circulation oven for 30 minutes at a temperature of between 105 and 115 deg C and allow it to cool in a desiccator to ensure complete dryness immediately prior to mixing it with the adhesive.

(b) Add 30 parts (by weight) of Versamid 140 to 70 parts (by weight) of Bakelite 18774/1 or Ciba AY105 and mix thoroughly.

(c) Add the dried cool Aerosil to the adhesive mixture and again thoroughly stir to ensure an even distribution of the powder.

C. Pressure and Leak Test (Ref. Fig. 802).

(1) Pressure and leak test the repaired duct according to its classification and measurement given in Figure 802.

D. Duct Installation and Test

(1) Install the repaired duct (Ref. 21-21-00, Removal/ Installation).

(2) Operationally test the air extraction system (Ref. 21-21-00. Adjustment/Test).

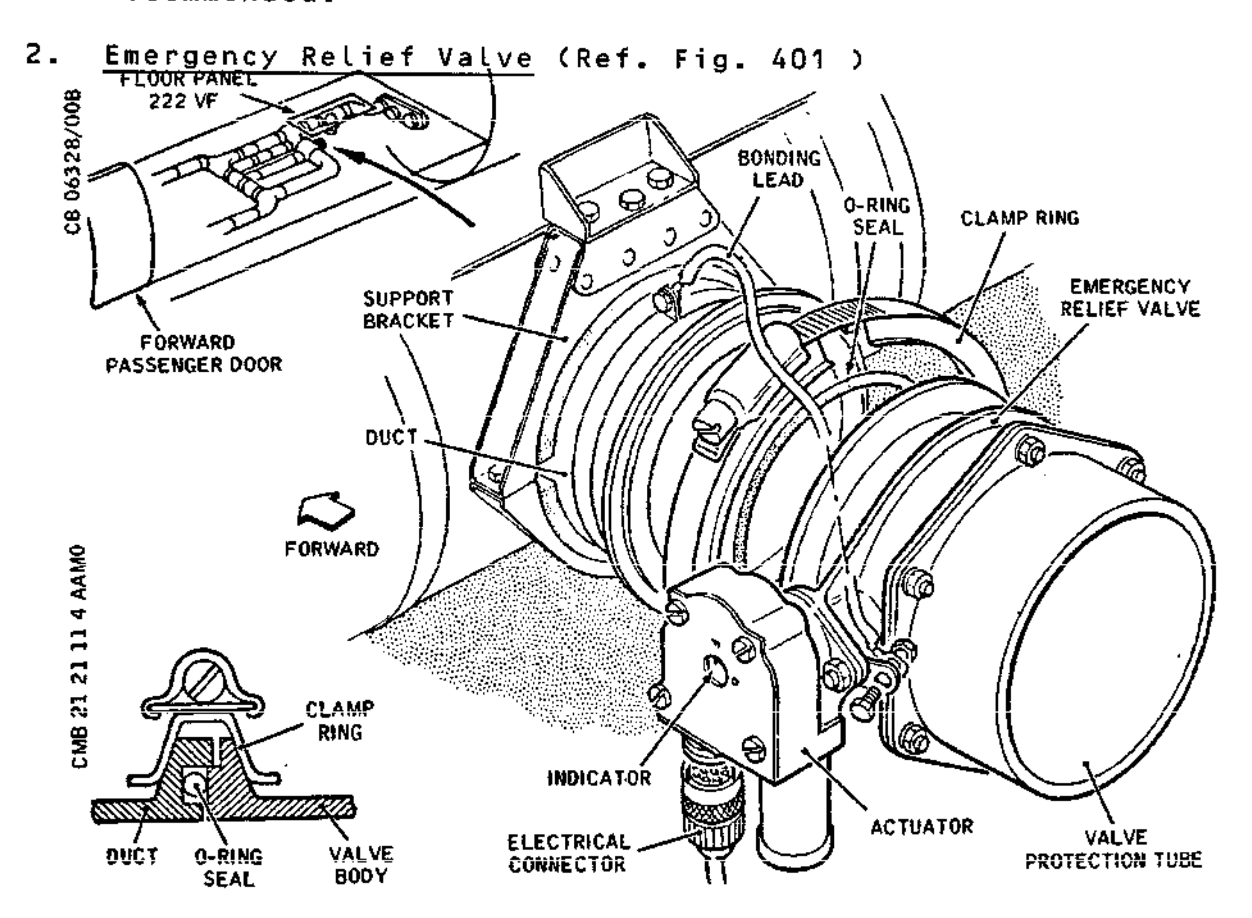
EMERGENCY RELIEF VALVE - REMOVAL/INSTALLATION

WARNING: OBSERVE THE ELECTRICAL PRECAUTIONS DETAILED IN 24-00-00.

1. General (Ref. Fig. 401)

The electrically operated emergency relief valve is located in the under-floor space above the nose landing gear bay (Zone 126). Access is obtained by removing floor panel
R 221UF. The valve is secured to the duct by a clamp ring which is closed by a worm drive. A protection tube is secured to the other side of the valve by six bolts and self-locking nuts. The valve must be closed before removal or installation to prevent possible damage to the flap. The actuator is fitted at the side of the valve and has a visual indicator that shows if the valve is open or closed. Renewal of the actuator with the valve in situ is not recommended.

2. Emergency Relief Valve (Ref. Fig. 401)



Emergency Relief Valve - Installation
Figure 401

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit breaker safety clip	-
Wire, corrosion-resistant 0.028 in (0.7 mm) dia	-

B. Prepare to Remove Valve

(1) Make available the ground electrical power as detailed in 24-41-00.

At the 3CM position, set the FWD EMERGY RELIEF switch on the EQUIPMENT BAY COOLING section of panel 2-214 to SHUT and see that this is shown by the magnetic indicator (Ref. Fig. 402).

(3) Isolate the valve by tripping circuit breaker H1281 on panel 1-213 at map reference G12. Fit a safety clip.

(4) Remove floor panel 221 UF.

(5) Check that the emergency relief valve is shut.

(6) Switch off and disconnect the ground power supply as detailed in 24-41-00.

C. Remove Valve

(1) Disconnect the electrical connector from the valve.

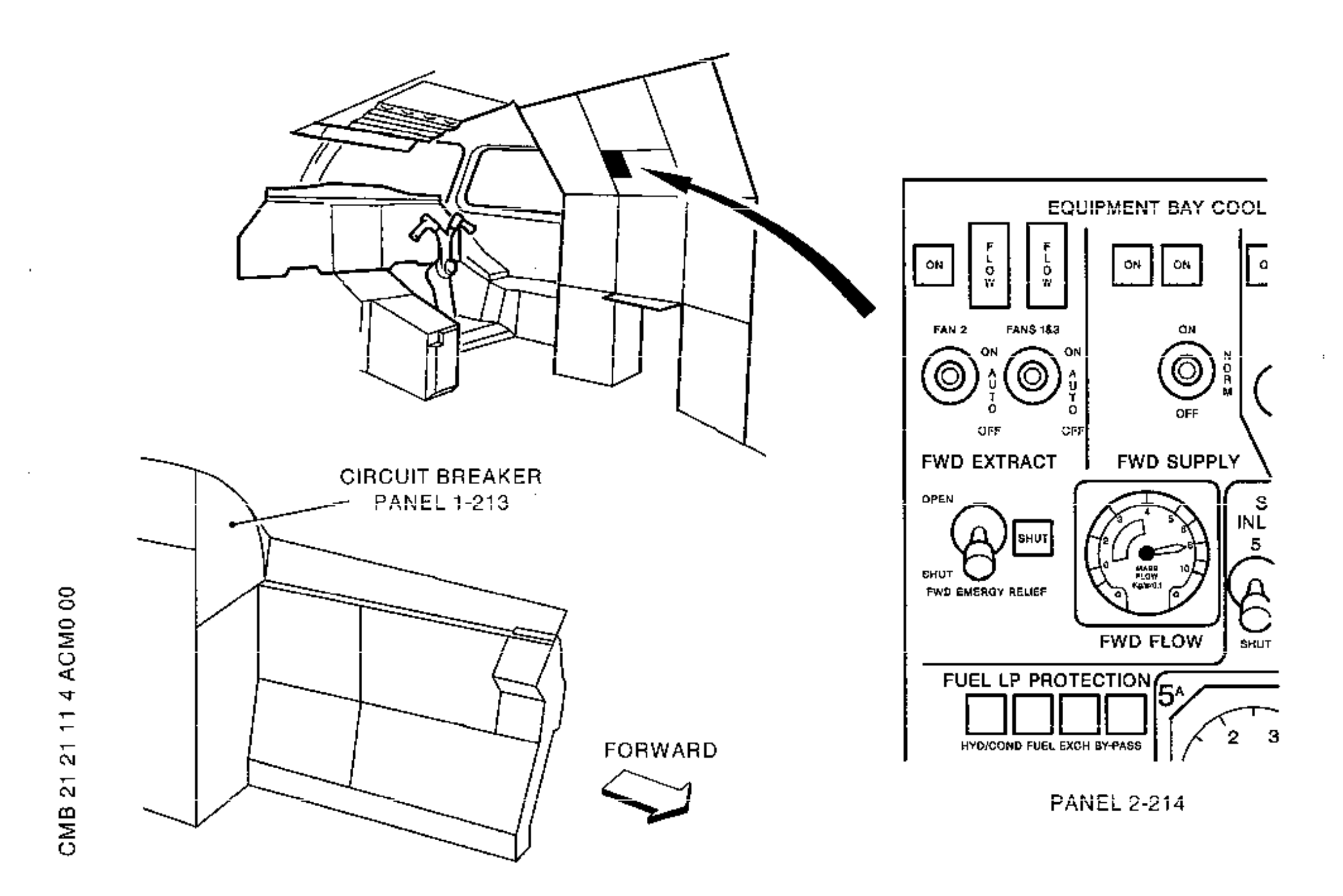
(2) Support the valve and remove the clamp ring that secures it to the duct; remove the valve with the attached protection tube.

(3) Fit a suitable blank to the open end of the duct.

(4) Remove the six nuts and bolts that secure the protection tube to the valve; remove the tube.

D. Install Valve

(1) Comply with the electrical safety precautions.



Emergency Relief Valve - Control and Indication
Figure 402

(2) Check the valve for freedom from damage, ensure that the flap is closed.

(3) Remove the blank cover from the duct and check that the duct is clean.

(4) Fit a new O-ring seal to the flange of the valve and butt the valve against the duct flange. Fit the clamp ring to secure the valve to the duct.

(5) Wire lock the clamp ring worm drive with 0.028 in (0.7 mm) dia corrosion-resistant locking wire.

(6) Secure the protection tube to the valve with the six bolts and self-locking nuts.

(7) Connect the electrical connector to the valve ensuring that the mating surfaces are clean and undamaged.

E. Conclusion

(1) Remove the safety clip from and reset circuit breaker H1281.

(2) Carry out an operational test of the valve (Ref. 21-21-00, Adjustment/Test).

EMERGENCY RELIEF VALVE - ADJUSTMENT/TEST

1. General

The emergency relief valve is electrically operated and is located in the underfloor space above the nose landing gear bay.

2. Operational Test

1. Check that electrical power is available and that the emergency relief valve switch on the equipment bay cooling panel is selected SHUT, which is the normal ground position, and that the magnetic indicator shows SHUT.

2. Select the emergency relief valve switch "OPEN" and check that the magnetic indicator moves to OPEN.

3. Return the emergency relief valve switch to "SHUT" and check that the magnetic indicator shows SHUT. The time taken for the valve operation should be 7-20 seconds in each direction.

4. When the valve is accessible for visual inspection a double check can be made by means of the valve position indicator on the side of the valve body.

NON-RETURN VALVES (INS AND WR EMERGENCY AIR SUPPLY) - REMOVAL/INSTALLATION

WARNING: OBSERVE THE ELECTRICAL PRECAUTIONS DETAILED IN 24-00-00.

1. General

The non-return valves comprise a hanging flap and a protective wire mesh or expamet grille, bonded together
R in a rectangular frame of resin bonded glass cloth. The INS left hand NRV is on the side wall in the forward LH amenity stowage. The INS right hand NRV is on the RH toilet side wall below the seat cover. The WR NRV is in a cowl mounted on the floor at the rear right hand corner of the RH forward equipment rack, just inside the plastic curtain.

2. INS Non-return Valve LH (Ref. Fig. 401)

A. Prepare to Remove Valve.

(1) Gain access to valve by opening up the forward LH amenity stowage about halfway up at the rear of the stowage.

B. Remove Valve.

(1) Remove the six screws securing the valve to the side-wall and duct.

(2) Remove the valve and joint.

(3) Close the opening with a suitable blank cover.

C. Install Valve.

(1) Remove the temporary duct cover.

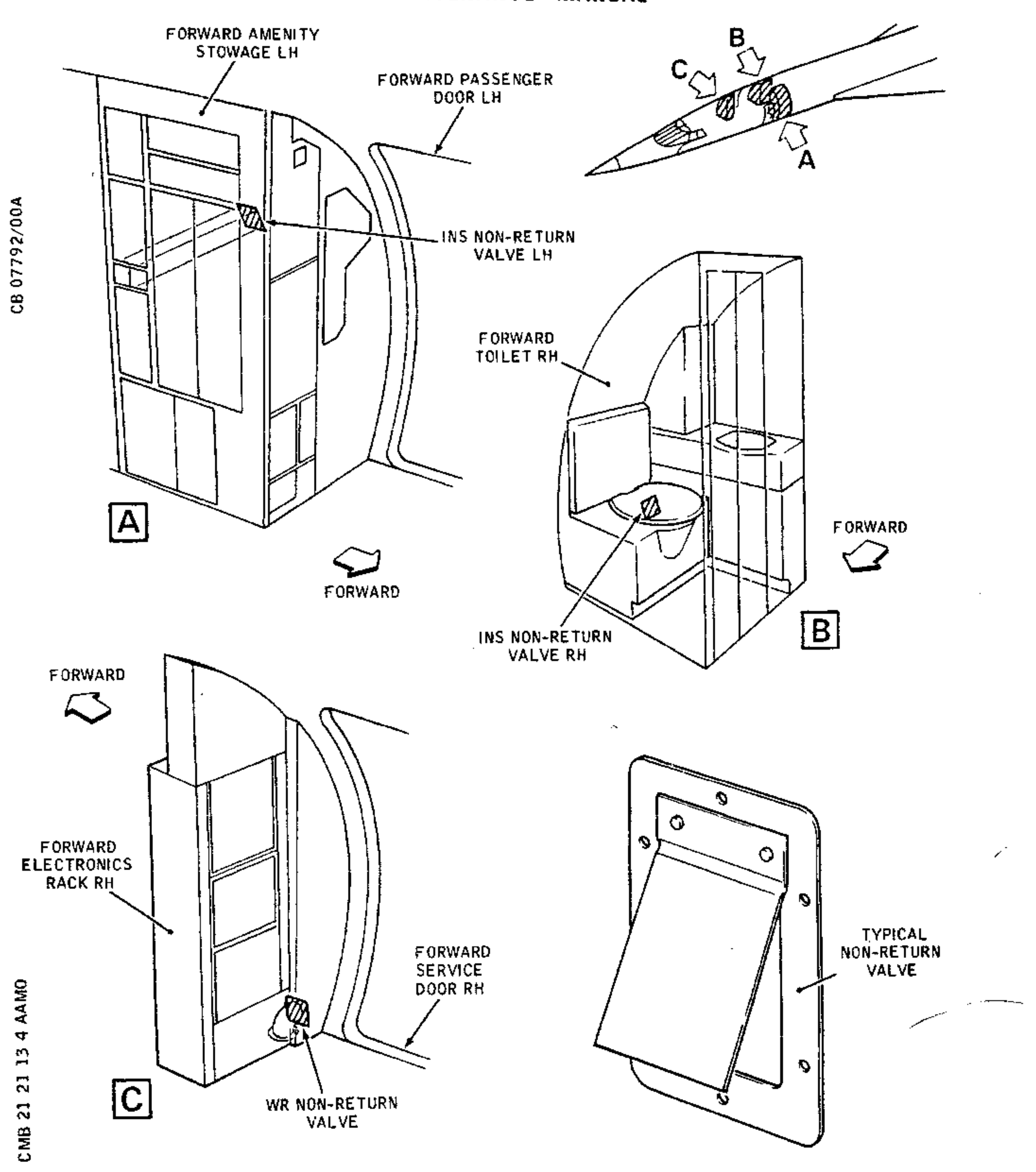
(2) Refit valve, hinge uppermost, with a new joint and secure to the sidewall and duct with the six re-taining screws.

(3) Replace any stowage shelves that were moved during preparation.

3. INS Non-Return Valve RH

A. Prepare to Remove Valve.

(1) Remove the two screws securing the forward toilet cover and remove the cover.



R INS and WR Non-return Valves
Figure 401

(2) Remove toilet fittings as necessary to give access to the valve, Ref.25-41-00, Toilets - Removal/ Installation.

B. Remove Valve

(1) Remove the ten screws securing the valve to the side wall and duct.

(2) Remove the valve and joint.

(3) Close the opening with a suitable blank cover.

C. Install Valve.

(1) Remove the temporary duct cover.

(2) Refit the valve, hinge uppermost, with a new joint and secure to the side wall and duct with the ten retaining screws.

(3) Refit the toilet equipment removed during preparation Ref.25-41-00.

4. WR Non-Return Valve

A. Prepare to Remove Valve.

(1) Disconnect all electrical supplies from the aircraft, Ref.24-00-00.

(2) Remove the forward stewards seat from the rear bulkhead of the RH forward equipment rack (Ref. 25-41-31, Removal/Installation).

(3) Unzip the Velcro fastening securing the plastic curtain to the floor, on the outboard side of the rack.

B. Remove Valve.

(1) Remove the four screws securing the valve and cowl to the floor and duct.

(2) Remove the valve and joint.

(3) Close the opening with a suitable blank cover.

C. Install Valve.

(1) Remove the temporary duct cover.

(2) Refit the valve, with a new joint, and secure to the floor and duct with the four retaining screws.

D. Conclusion

(1) Refasten the Velcro joint securing the plastic curtain, ensuring complete closure of the gap.

(2) Refit the forward stewards seat, (Ref.25-41-31, Removal/Installation).

NON-RETURN VALVES (INS AND WR EMERGENCY AIR SUPPLY) - ADJUSTMENT/TEST

1. General

Three flap valves of similar resin bonded glass cloth construction are located in the forward vestibule area. Each valve is bonded into a detachable unit complete with surround and wire mesh grille.

2. Operational Test

(1) Gain access to the three flap valves as detailed in 21-21-13, Removal/Installation.

(2) Check the valve flaps for freedom of movement by inserting a small screwdriver or similar tool through the grilles and working the flaps.

(3) Restore the furnishings to their normal position.

NON-RETURN VALVES (INS AND WR EMERGENCY AIR SUPPLY) - INSPECTION/CHECK

1. General

Three flap valves of similar resin bonded glass cloth construction are located in the forward vestibule area. Each valve is bonded into a detachable unit complete with surround and wire mesh grille and must be removed for imspection.

2. Non-return Valves (INS and WR Emergency Air Supply)

R A. Equipment and Materials

R

DESCRIPTION	PART NO.
Methyl-ethyl-ketone (MEK) (Ref. 20-30-00, No.470)	-

R

R

R

B. Prepare.

(1) Remove the three flap valves as detailed in 21-21-13, Removal/Installation.

(2) Clean the valves and guards in general purpose
R cleaning fluid methyl-ethyl-ketone (MEK). No.470).

C. Inspect.

(1) Inspect the valves and check that they are clean.

(2) Check that the glass cloth hinges are sound and free from frayed or broken fibres.

(3) Check that the valve flaps are flat and free from cracks and discolouration and that they seat fairly on the valve surrounds.

D. Conclusion.

(1) Refit the valves as detailed in 21-21-13, Removal/Installation.

(2) Restore the furnishings to their normal position.

R EXTRACT FILTER (No.1 GALLEY) - INSPECTION/CHECK

1. General

A disposable filter is located in the extract duct between the top of the galley and the roof panels. An identification label with a direction-of-flow arrow is attached to the filter. Access is gained by removing the spring clipped trim panel.

2. Inspection/Check

A. Prepare

(1) Press the metal push button and remove the trim panel from the extract duct.

(2) Remove the filter.

(3) Fit a blank cover over the duct opening.

B. Inspect

(1) Inspect the filter frame and check that it is clean and free from damage.

(2) Check that the filter element is intact and not discoloured. Check that dust has not penetrated through the element.

(3) Ensure that the self adhesive identification label is intact and legible.

C. Conclusion

(1) Remove the blank cover from the duct.

(2) Fit a serviceable filter element with the direction of flow arrow pointing towards the duct.

(3) Replace the grille.

RELIEF NRV - REMOVAL INSTALLATION

1. General

This valve is fitted to a short branch duct of the forward extract ducting immediately upstream of the plenum chamber, underneath the passenger compartment floor in zone 125. Access is gained by removal of floor panel, 221 XF.

2. By-pass Valve (Ref. Fig. 401)

A. Equipment and Materials

DESCRIPTION	PART NO.
Torque spanner (0-120 lbf in; 0-1.35 mdaN range)	-
Torque set screwdriver	-
Wire, non-corrodible steel 0.028 in (0.7 mm) dia	-

B. Prepare to Remove Relief NRV

(1) Move the passenger seats forward or aft as required to gain access to floor panel 221 XF.

(2) Pull the carpet aside to expose the floor panels, and remove and retain the countersunk bolts around the edge of the floor panels.

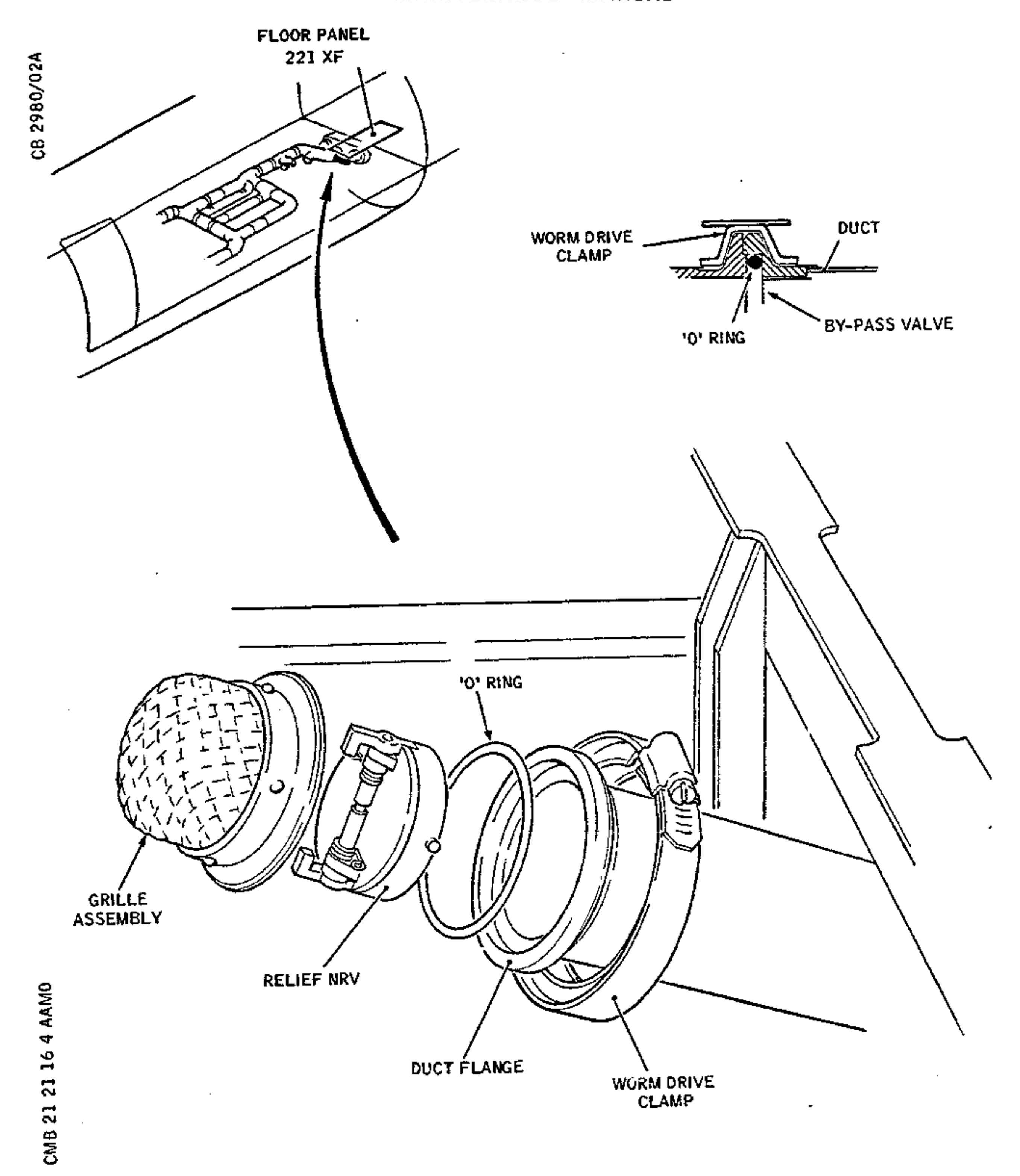
(3) Locate the lifting tapes at the edge of each panel, and pull them to raise each panel from its recess. Remove the panels.

CAUTION: DO NOT DAMAGE THE PANEL SEALING STRIPS.

C. Removal

(1) Loosen the wormdrive clamp securing the grille assembly and valve to the duct. Slide the clamp back over the duct.

(2) Withdraw the grille assembly and valve from the duct, and remove the O-ring seal from the groove in the flange of the branch duct. Discard the seal.



Relief NRV - Installation
Figure 401

(3) If a replacement valve is not to be fitted immediately, refit the grille assembly to the open end of the duct and fit the floor panel.

D. Installation

(1) Remove the floor panel and the blank cover fitted to the duct.

(2) Ensure that the duct is clear of debris, and fit a new O-ring seal in the groove in the flange of the duct.

(3) Remove the blank cover from the valve and inspect the valve for freedom from damage; ensure that the grille assembly is clean.

(4) Fit the valve to the grill assembly and engage the locating spigot on the valve body with the slot in the grille assembly.

(5) Assemble the mating flange of the duct and the grille assembly and align the two red arrows. Secure the flanges with the clamp, and lock the clamp with wire.

(6) Operationally test the valve as detailed in 21-21-16, Adjustment/Test.

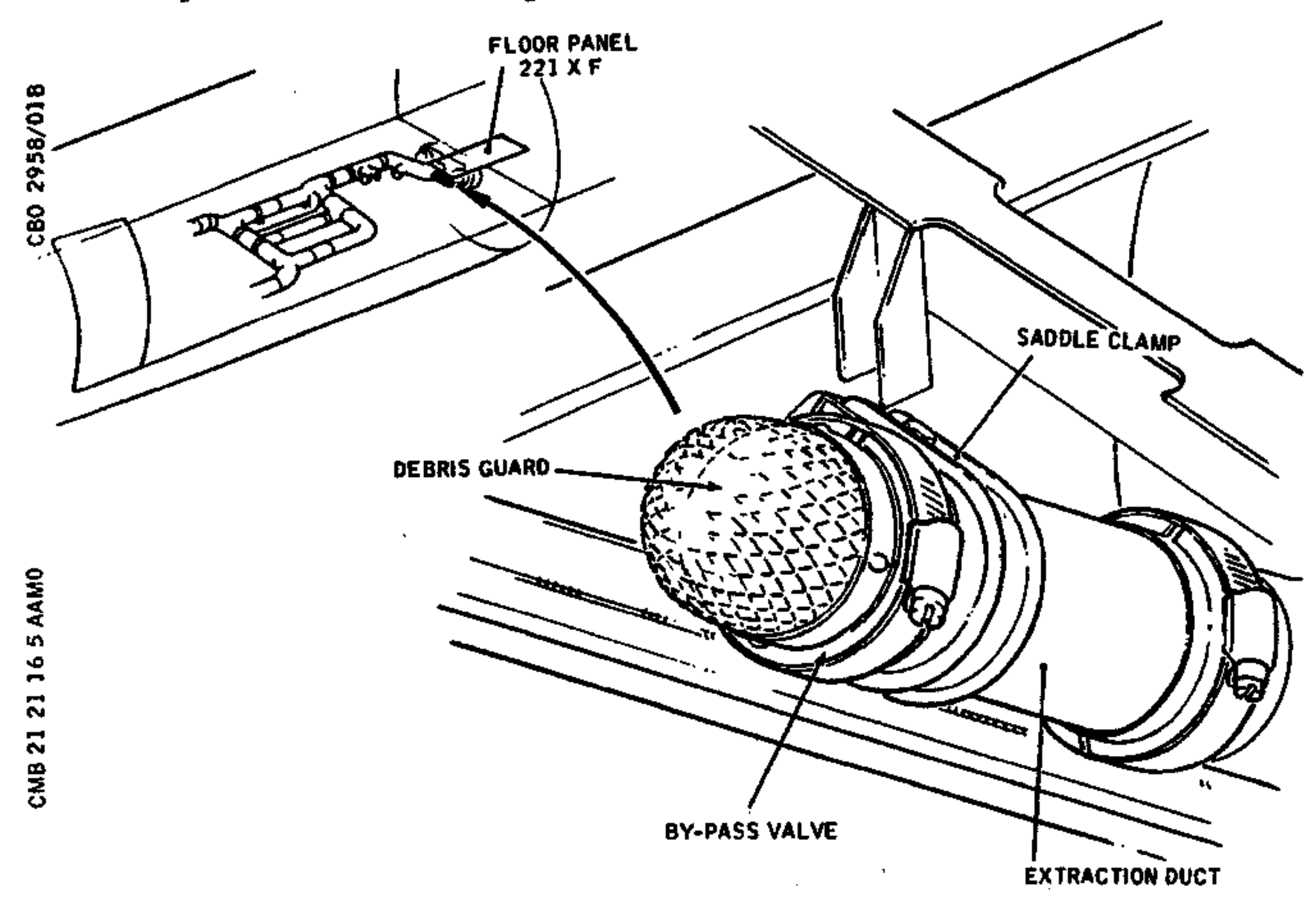
(7) Fit the floor panels and secure them with countersunk bolts. Torque load each bolt to between 20 and 25 lbf in (0.22 and 0.28 mdaN).

(8) Fit the carpet over the floor panels, and move the passenger seats back to their original positions.

RELIEF NRV - ADJUSTMENT/TEST

1. General (Ref. Fig. 501 and 502)

The relief NRV is a 3 in non-return valve for the improvement of fan characteristics. Access is through the passenger compartment floor at panel 221 XF.



Relief NRV - Installation
Figure 501

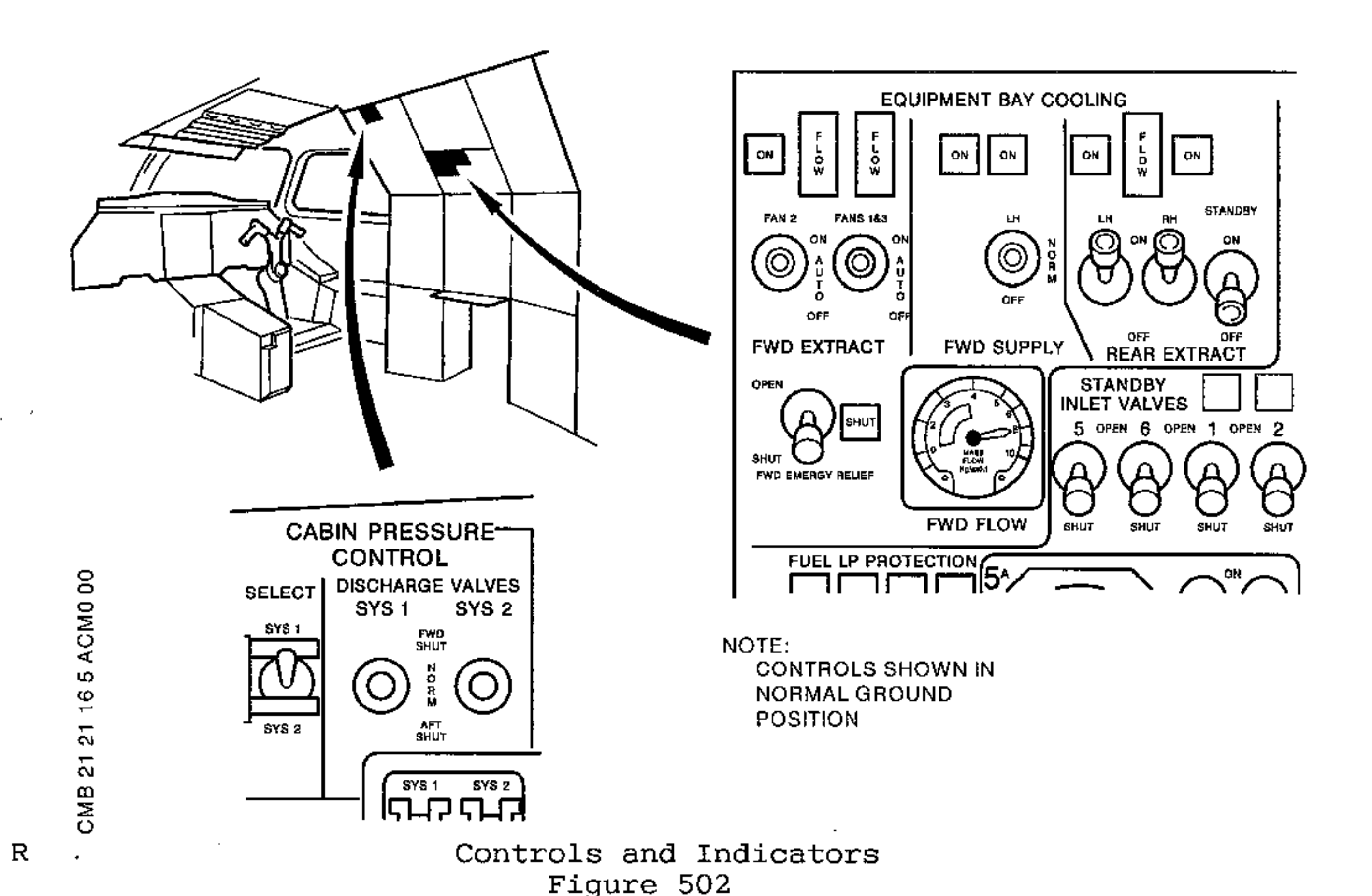
2. Operational Test of Non-Return Valve

A. Prepare to Test Relief NRV:

(1) Move the passenger seats forward or aft as necessary to gain access to floor panel 221 XF.

(2) Pull the carpet aside and remove the countersunk bolts securing the floor panel.

(3) Locate the lifting tapes and remove the floor panel.



R

Controls and Indicators
Figure 502

B. Test

(1) With the air extraction fans running in the normal ground state, close both cabin pressure control discharge valves SYS 1 and SYS 2. Check that the non-return valve plates open fully by observation through the debris guard.

(2) Reset the DV switches to NORM and check that the valve plates close fully under spring pressure.

C. Conclusion

(1) Replace floor panel 221 XF and tighten the countersunk bolts to a torque load of between 20 and 25 lbf in (0.22 and 0.28 mdaN).

(2) Restore the carpet and passenger seats to their original position.

FANS (FORWARD RACK EXTRACTION) - REMOVAL/INSTALLATION

WARNING: OBSERVE THE ELECTRICAL PRECAUTIONS DETAILED IN CHAPTER 24-00-00

1. General

The three extraction fans are located in the underfloor area above the nose landing gear bay (zones 125 and 126), and are accessible after removal of the appropriate floor panels. Attached to each fan is a small arrowed plate indicating the direction of airflow through the fan and the direction of rotation of the fan impeller.

2. Fan

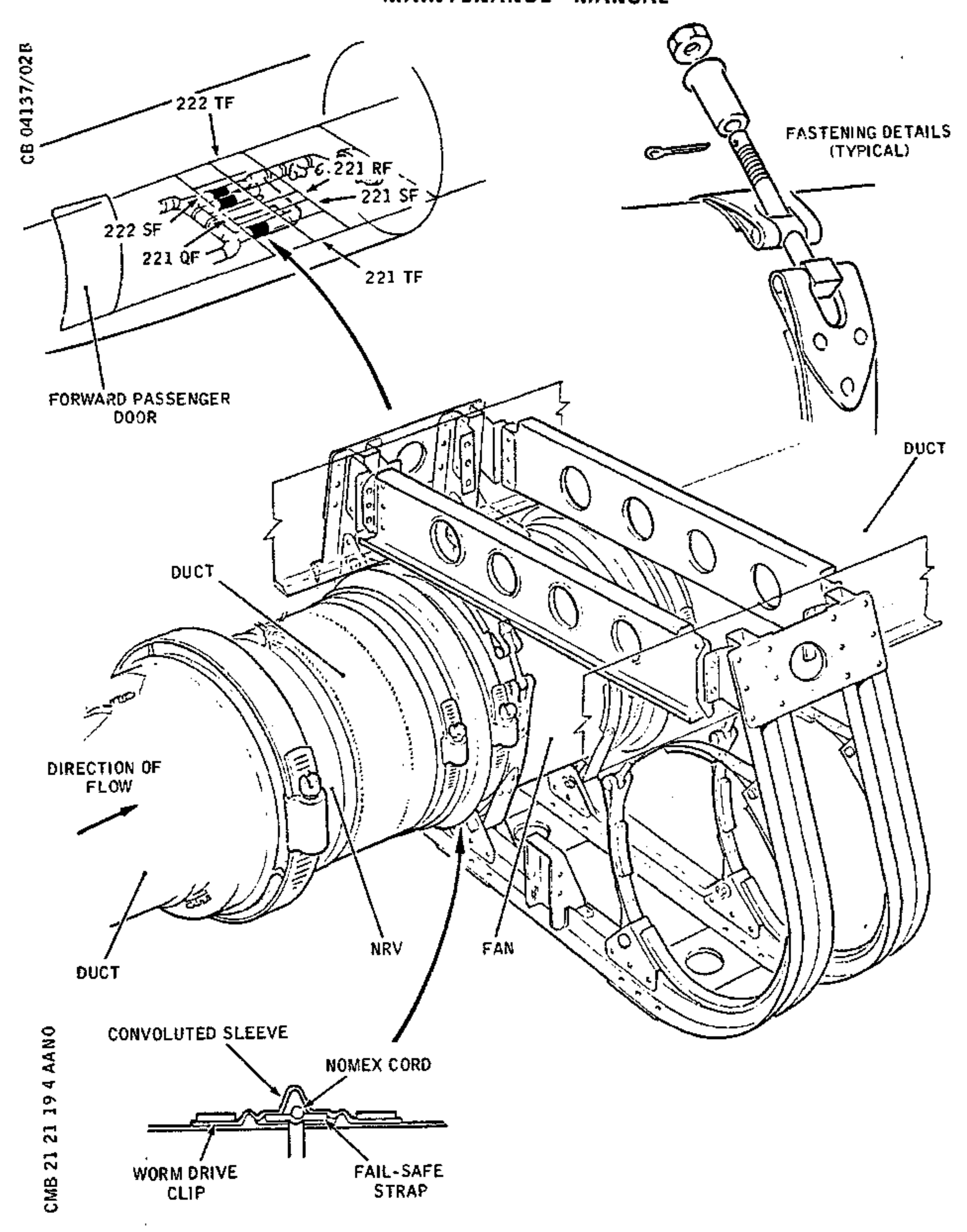
A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit breaker safety clips	-
Torque spanner 25-30 lbf in (0.28 - 0.33 mdaN) range	-
R Wire, corrosion resistant 0.028 in (0.7 mm) dia.	-

B. Prepare to Remove Fan

(1) Trip the circuit breaker associated with the
R fan to be removed. Fit a safety clip.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
FWD RACK EXTRT FAN NO 1 SUP & CONT	14-215	H 1183	E 2
FWD RACK EXTRT FAN NO 3 SUP & CONT	13-216	H 1182	G21
FWD RACK EXTRT FAN NO 2 SUP & CONT	14-216	H 2011	D20



Forward Extraction Fan - Installation
Figure 401

(2) Remove the appropriate cabin floor panels:
Panel 221 SF for LH fan.
Panel 222 SF for RH and Standby fans.

NOTE: RH fan is located outboard of Standby fan.

C. Remove

(1) Disconnect the fan electrical connector.

(2) Remove intercostal to facilitate removal of fan.

(3) Unlock and slacken the worm-drive clips that secure the convoluted sleeve over the fail-safe strap joints upstream and downstream of the fan. At each joint, ease one clip and the sleeve on to the duct. Slide the remaining clip on to the duct or remove the clip.

(4) Cut the Nomex cord to release the fail-safe strap at each joint and slide it on to the duct.

(5) Disconnect the bonding lead attachment to the fan electrical receptacle.

(6) Remove the split pins, nuts and sleeves securing the fan retaining straps, support the fan and disconnect the straps.

(7) Remove the fan from its mounting brackets and blank off each end.

(8) If a replacement fan is not to be fitted immediately, blank off the exposed ends of the duct and the non-return valve.

D. Install

(1) Remove the blanking covers fitted to the exposed duct and the non-return valve. Ensure that the ducts are clear of debris, and that the rubber insulating strips bonded to the fan mounting brackets are serviceable. Check that the fan NRV flaps can be opened freely and close under spring pressure when released.

(2) Check the fan for cleanliness and position it in the fan mounting brackets.

NOTE: Ensure that the direction arrow on the fan casing is indicating a rearward direction of

flow.

(3) Loosely connect the fan retaining straps with a sleeve and nut, and position the electrical cable aperture to the bottom of the fan casing.

(4) Position the fan centrally in its mounting brackets, so that the joint gaps are equidistant and are between 0.2 in and 0.3 in (5.0 and 7.6 mm). Tighten the fan retaining straps, torque load the nuts to between 25 and 30 lbf in (0.28 - 0.33 mdaN) and secure each nut with a split pin.

(5) Slide the fail-safe straps into position at the fan/duct joints.

(6) Bind each fail-safe strap with one turn of Nomex cord, secured with a safe knot. Check that the gap between the ends of the strap is between 0.1 in and 0.5 in (2.54 mm and 12.7 mm).

(7) Ease each convoluted sleeve to a central position over its joint and secure it with worm-drive clips. Lock the clips with wire.

(8) Ensure that the electrical plug and receptacle mating surfaces are clean and undamaged; connect the plug to the fan.

(9) Ensure that the bonding lug on the fan electrical receptacle and the bonding lead attachment surfaces are clean and uncontaminated. Connect the lead to the bonding lug with a nut, bolt and washer and torque load to 30-40 lb in (0.34 - 0.45 mdaN).

(10) Remove the safety clips and reset the circuit breakers.

(11) Operationally test the extraction fan as detailed in 21-21-19, Adjustment/Test.

(12) Refit intercostal. Torque load both bolts to between 30 and 40 lbf/in (0.34 and 0.45 mdaN).

(13) Fit the floor panels.

FANS (FORWARD RACK EXTRACTION) - ADJUSTMENT/TEST

1. General

Three extraction fans draw air through the forward equipment racks and discharge it overboard through the two forward discharge valves. Fans 1 & 3 are controlled by a single ON-AUTO-OFF switch. Fan 2 is separately switched.

NOTE: The following tests are the minimum tests required after fan connections have been disturbed to prove that
R the fans run and are unobstructed, the fan NRV's open
R and shut correctly and that the centre NRV is shut. The
R tests also check the wiring and switch for the emergency
R ON selection and operation of the FLOW warning system.

2. Operational Test (Ref. Fig. 501)

A. Prepare to Test Forward Extraction Fans:

(1) Check that the passenger compartment doors are open, or that a ground air supply is connected (Ref.12-14-21).

(2) Make available electrical ground power (Ref.24-41-00).

(3) Check that the pressure control discharge valve switches are selected NORMAL and that the discharge valves are open.

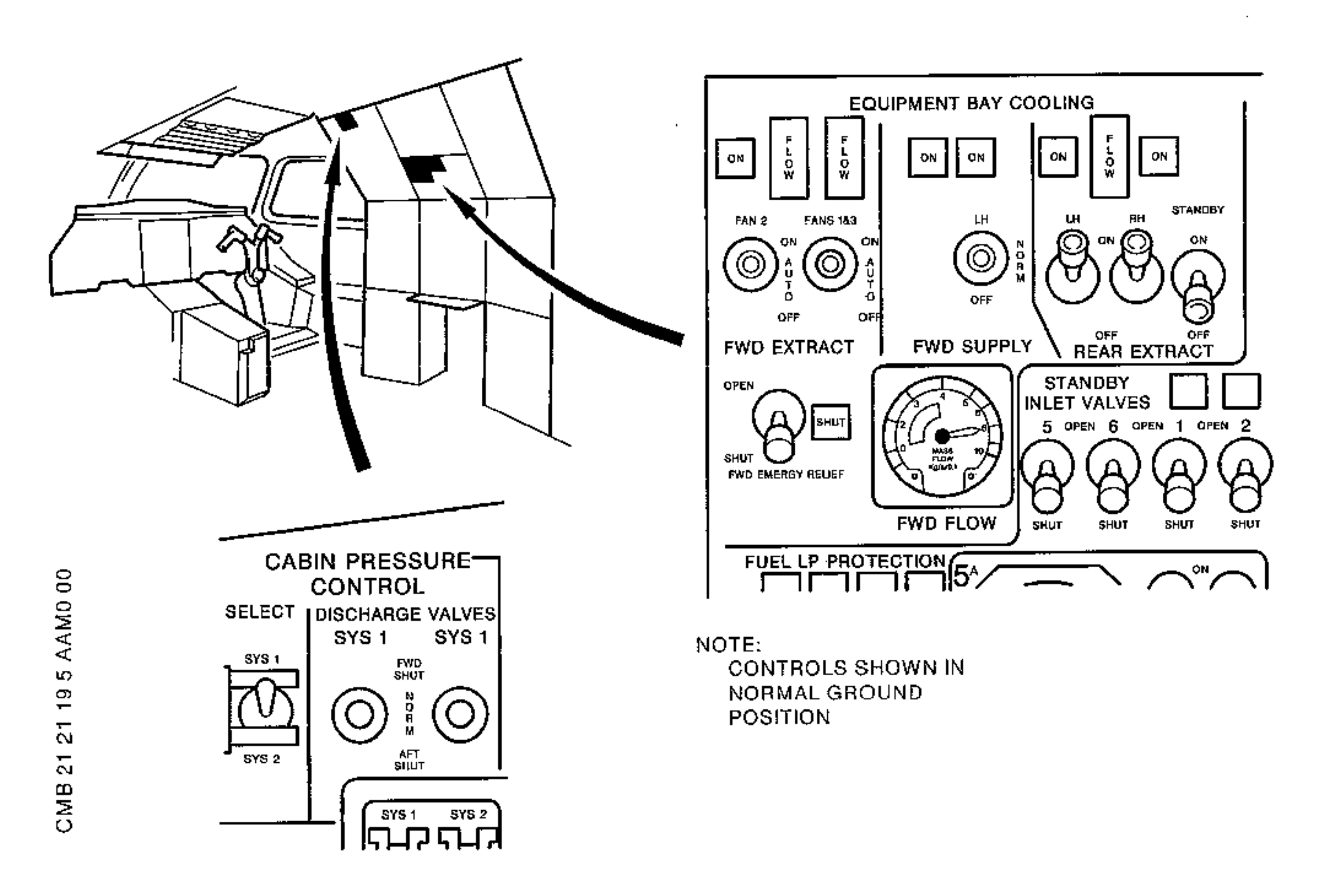
(4) Check that the switches and indicators on the equipment bay cooling panel are in the normal ground position.

(5) Press the filament test push switch and check that the FLOW caption light operates.

B. Test.

(1) Select FWD EXTRACT FAN 2 switch "OFF". Check that the associated magnetic indicator shows OFF, the LH and RH forward FLOW captions remain extinguished and the FWD FLOW indicator reads 0.7-0.85 kg/s.

(2) Select FWD EXTRACT FANS 1 & 3 switch "OFF". Check that the LH and RH forward FLOW captions illuminate the AIR master warning activates and audio gong sounds, and that the FWD FLOW indicator reads zero. Check also that the ground call horn sounds after approximately six seconds.



Air Extraction - Controls & Indicators
Figure 501

NOTE: If the ground call horn does not sound within 10 seconds, fan circulation should be restored.

(3) Select FWD EXTRACT FAN 2 switch "ON". Check that the LH and RH forward FLOW captions are on or off (intermediate state), the AIR master warning is correspondingly on or off and that the FWD FLOW indicator reads 0.4-5.5 kg/s.

(4) Select FWD EXTRACT FANS 1 & 3 switch "ON". Check that the LH and RH forward FLOW captions are extinguished, the AIR master warning is extinguished the FWD EXTRACT magnetic indicator shows ON and the FWD FLOW indicator reads 0.85-1.1 kg/s.

(5) Select FWD EXTRACT FAN 2 switch to "OFF". Check that the LH and RH forward FLOW captions remain off and that the FWD EXTRACT magnetic indicator shows OFF. Check that the FWD FLOW indicator reads 0.7 to 0.85 kg/s.

(6) Select FWD EXTRACT FAN 2 switch to "AUTO" and select FWD EXTRACT FANS 1 & 3 switch to "AUTO". Check that the LH and RH forward FLOW captions remain off and that the FWD EXTRACT magnetic indicator shows ON. Check that the FWD FLOW indicator reads 0.85 to 1.1 kg/s.

C. Conclusion

(1) Ensure that the switches and indicators on the equipment bay cooling panel and the cabin pressure control panel are in the normal ground position.

(2) Switch off and remove the ground electrical supply (Ref.24-41-00).

(3) Switch off and remove the ground air supply (Ref. 12-41-21).

PRESSURE SWITCHES - REMOVAL/INSTALLATION

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED IN 24-00-00.

1. General

R There are three pressure switches in the air extraction ducting
R systems. Two are associated with the forward extraction
R and are located in zone 123/124 below the forward electronics
R racks. The other switch, associated with the rear extraction
R ducting, is located beneath floor panel 243 GF in the rear
R baggage compartment (Ref. Fig. 401).

2. Pressure Switches (Ref. Fig. 401)

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit breaker safety clips	-
Loctite sealant	DTD 900/4588
Locquic primer	DTD 900/4588
Torque-set screwdriver	-
Torque spanner (0 to 130 lbf in; 0 to 1.36 mdaN range)	-

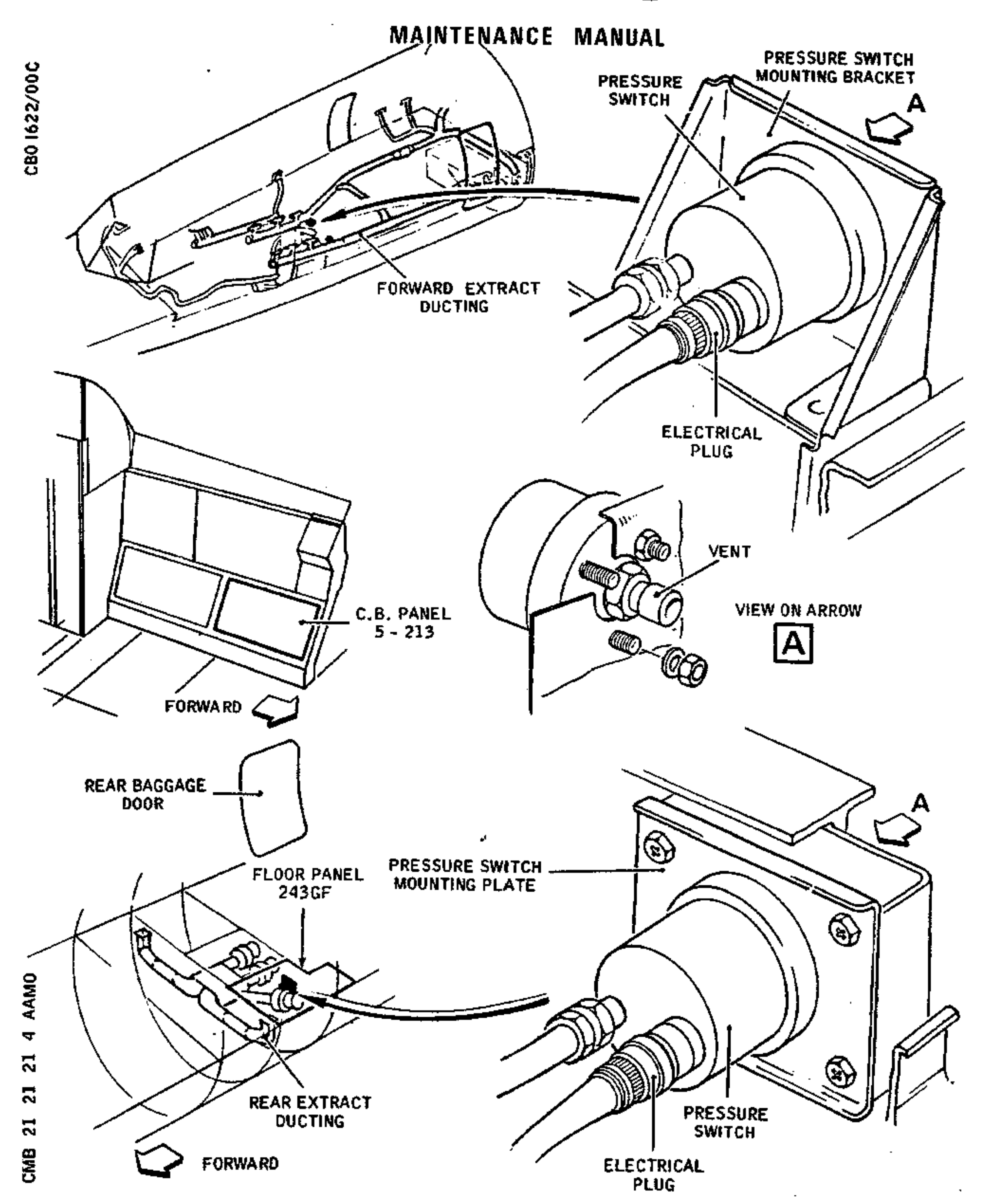
B. Prepare to Remove Pressure Switch

(1) Electrically isolate the pressure switch to be removed by tripping the appropriate circuit breaker on panel 5-213 and fitting a circuit breaker safety clip.

R (a) Forward pressure switch circuit breakers LH,H1186
R map ref. C8 and RH, H 2027, map ref. H 11.

(b) Rear pressure switch circuit breaker H1186, map ref. C9.

R (2) Gain access to the forward pressure switches by
R removing access panel 123 AB. Locate panel 234 GF
R in the rear baggage hold, for the rear pressure



Pressure Switches - Installation
Figure 401

R switch.

(3) Remove and retain the countersunk bolts around the edges of the panels.

CAUTION: DO NOT DAMAGE THE PANEL SEALING STRIPS.

(4) Locate the lifting tape at the edge of each panel and pull to raise the panel. Remove the panels.

C. Remove Pressure Switch

(1) Disconnect the electrical plug from the pressure switch.

(2) Disconnect the hose from the pressure switch.

(3) Remove the three nuts or mounting plate, and washers that secure the pressure switch to the bracket, as appropriate. Remove the switch and fit a blank cover to the exposed hose connector and to the vent.

(4) If a replacement pressure switch is to be fitted, remove the hose adapter from the switch body and discard the O-ring seal fitted to the adapter.

(5) If the replacement pressure switch is not to be fitted immediately, fit a blank cover to the exposed end of the hose and temporarily fit the floor panel.

D. Install Pressure Switch

(1) Comply with the electrical safety precautions.

(2) Remove the appropriate floor panels. Remove the blank covers from the pressure switch connectors. Place a new O-ring seal on the adapter; fit the adapter to the switch and torque load it to between 107 and 117 lbf in (1.2 and 1.32 mdaN).

(3) Clean the threads of the switch attachment studs and coat them sparingly with Locquic primer. Allow one hour for drying, then apply a very small quantity of Loctite sealant to the start of the thread of each stud and secure the switch to the mounting bracket or plate with nuts and washers. Torque load each nut to between 35 and 40 lbf in (0.4 and 0.45 mdaN).

(4) Remove the blank cover from the end of the hose. Connect the hose to the switch and torque load the union to between 70 and 120 lbf in (0.79 and 1.37

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mdaN).

(5) Ensure that the mating surfaces of the electrical connector and switch are clean and undamaged; connect the connector to the switch.

(6) Ensure that the switch vent is not obstructed by the underfloor insulation.

(7) Remove the safety clip and reset the circuit breaker tripped previously.

(8) Operationally test the pressure switch as detailed in 21-21-00, Adjustment/Test.

R (9) Fit the access panel or floor panel as required and
R secure it with countersunk bolts. Torque load each
R bolt to between 20 and 25 lbf in (0.22 and 0.28 mdaN).

PRESSURE SWITCHES - ADJUSTMENT/TEST

1. General

There are three switches in the air extraction systems. The controls and indicators are on the equipment bay cooling section of panel 2-214 at the 3CM station. The forward discharge valves are controlled from the cabin pressure control section of panel 1-214, also at the 3CM station.

In the normal ground condition when the fans are running, duct depression opens the switches and cancels the FLOW caption lights.

2. Operational Test (Ref. Fig. 501)

A. Prepare to Test Pressure Switches

(1) Check that the passenger compartment doors are open, or that a ground air supply is connected (Ref. 12-14-21)

(2) Make available electrical ground power (Ref. 24-41-00, Servicing).

(3) Check that cabin pressure control discharge valve switches are selected NORMAL and that the discharge valves are open.

(4) Check that the switches and indicators on the equipment bay cooling panel are at the normal ground state.

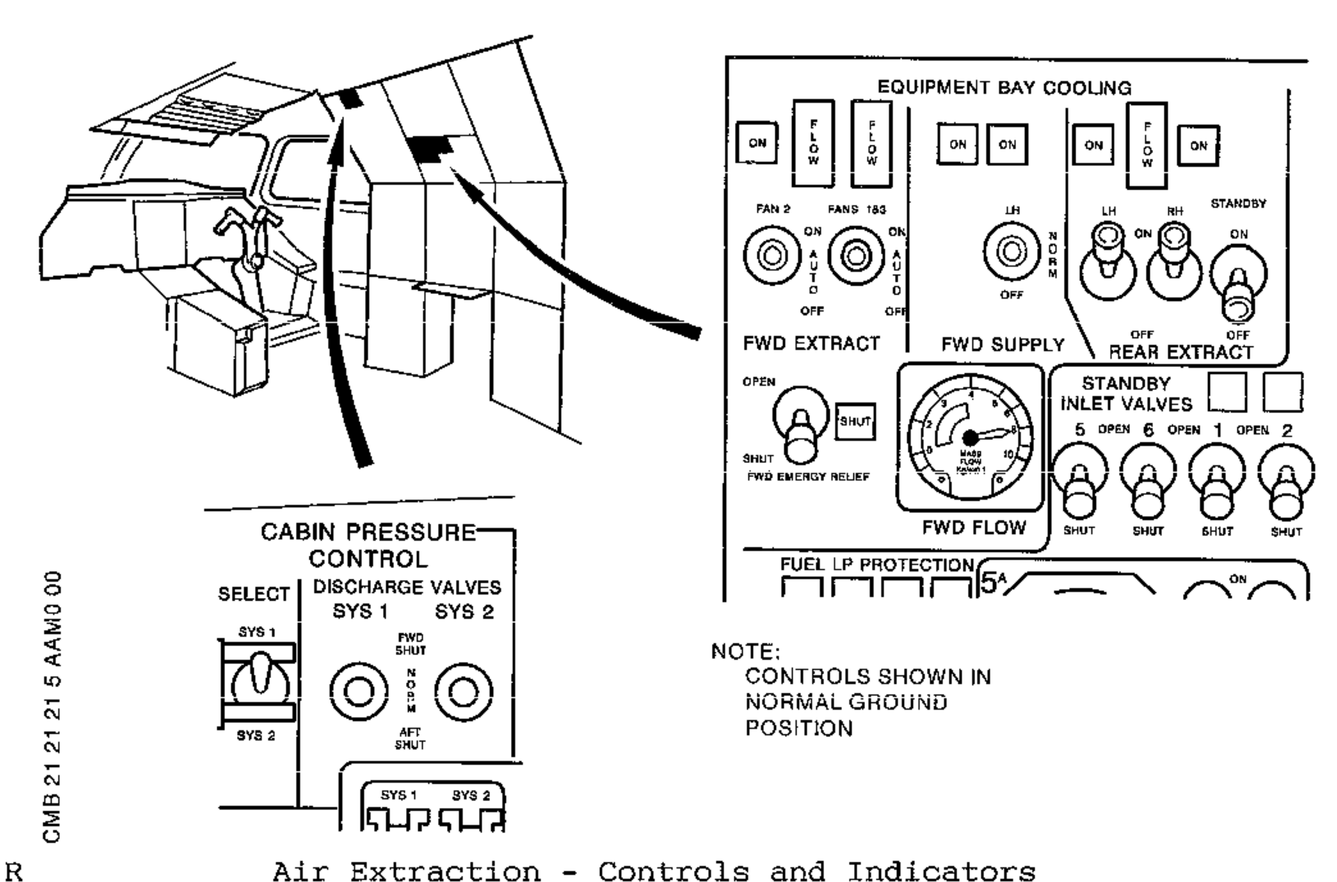
(5) Press the filament test push switch and check that the FLOW caption is illuminated.

B. Pressure Switch Test

(1) Switch "OFF" the three FWD EXTRACT fans, check that both forward FLOW caption lights are illuminated (Ref. Fig. 501) and that there is an AIR master warning and audio gong.

(2) Switch "ON" the three FWD EXTRACT fans and check that both forward FLOW captions are extinguished and that the AIR master warning is cancelled.

(3) Switch "OFF" the left and right hand rear extraction fans and check that the rear FLOW caption is illuminated, and that there is an AIR master warning.



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R Air Extraction - Controls and Indicators
Figure 501

(4) Switch "ON" one rear extraction fan and check that the rear FLOW caption light is extinguished, and that the AIR master warning is cancelled.

C. Conclusion

(1) Ensure that the switches and indicators on the equipment bay cooling panel are at the normal ground state.

(2) Switch off and remove the ground electrical supply (Ref. 24-41-00, Servicing).

(3) Switch off and remove the ground air supply (Ref. 12-14-21).

FANS (FORWARD VESTIBULE RACKING SUPPLY) - REMOVAL/INSTALLATION

WARNING: OBSERVE THE ELECTRICAL PRECAUTIONS DETAILED IN 24-00-00.

1. General

Two electrically operated fans, mounted one on each side of the underfloor bay (zones 123 and 124), extract air from the cabin ducting and supply it to cool the forward vestibule electronic racking. Access to the fans is gained by removing the access door 123BB.

2. Fans (Ref. Fig. 401)

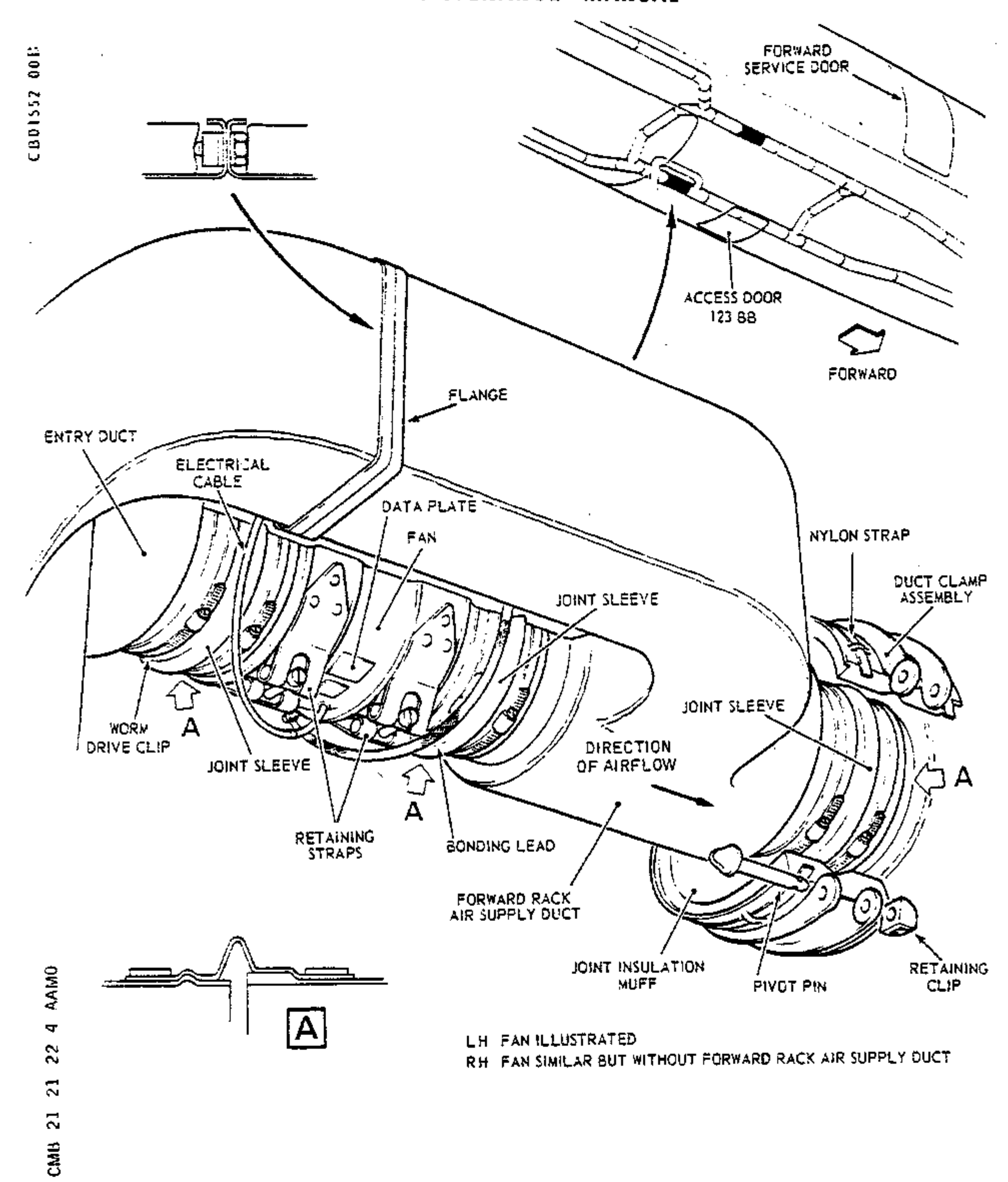
A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit breaker safety clips	-
Torque spanner (0 to 45 lbf in; 0 to 0.5 mdaN)	-
Non-corroding steel wire - 0.028 in (0.7 mm) dia	-

B. Prepare to Remove Fan

(1) Electrically isolate the fan by tripping the relevant circuit breakers listed below. Fit safety clips.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
RH FWD SUPPLY FAN SUP & CONT	14-216	2H1181	A20
COOLING FANS & LH FWD DUCT FLOW IND	5-213	H1187	C 8
LH FWD SUPPLY FAN SUP & CONT	13-215	1H1181	A 1
REAR FLOW & LH FWD AIR SUP & REAR FAN IND	5-213	H1186	C 9



Fan (Forward Vestibule Racking Supply)
- Installation
Figure 401

(2) Open the access door 123BB, by releasing the handle and turning it clockwise; push the door inwards and remove it through the aperture.

(3) For the left hand fan, remove the forward rack air supply duct.

(a) Remove the bolts from the forward rack air supply duct attachment flange.

(b) Disconnect the duct clamp assembly at the forward joint by rotating the pivot pin to release the nylon retaining clip. Release the nylon straps securing the joint insulation muff and remove the muff.

(c) Loosen the worm drive clips securing the forward and rear joint sleeves to the forward rack air supply duct. Support the duct and turn back the sleeves to expose the ends of the duct. Remove the duct.

C. Remove Fan

(1) Disconnect the fan electrical plug from the receptacle and unclip the cable from the floor support.

(2) Loosen the worm drive clip securing the entry duct joint sleeve to the fan, and turn back the sleeve to expose the rear end of the fan.

(3) Disconnect the bonding lead from the fan casing.

(4) Support the fan and remove the retaining strap trunnion screws.

(5) Remove the fan from its mounting brackets and fit blank covers to each end.

(6) If a replacement fan is not to be fitted immediately, fit blank covers to the exposed ends of the ducts.

D. Install Fan

(1) Comply with the electrical safety precautions.

(2) Remove the blank covers from the aircraft ducts at the fan mounting position and inspect the ducts for cleanliness and damage.

(3) Check that the NRV on the upstream side of the fan is serviceable. Check that the valve flaps open fully and close under spring pressure when released slowly.

(4) Ensure that the insulation strips bonded to the mounting brackets are serviceable. Check the fan for cleanliness and freedom from damage and position it in the mounting brackets so that the flow direction arrow on the fan data plate points forward.

(5) Loosely connect the fan retaining straps with the trunnion screws and turn the fan so that the electrical supply cable emerges from the fan casing at its lowest point.

(6) For the left hand fan, install the forward rack air supply duct:

(a) Position the forward rack air supply duct, fit the duct flange attachment bolts and torque load them to between 40 and 45 lbf in (0.45 and 0.51 mdaN).

(b) Turn down the forward joint sleeve and secure it with the worm drive clip. Lock the clip with 0.28 in (0.7 mm) dia non-corrodible steel wire.

(c) Fit the insulation muff to the forward joint and secure the muff with its nylon straps. Close the duct clamp assembly around the joint insulation muff and lock the clamp with the nylon pivot pin and retaining clip.

(7) Centrally position the fan in its mounting brackets, so that the joint gaps are equal and between
R 0.2 in and 0.3 in (5.08 mm and 7.62 mm). Torque-load
R fan retaining strap trunnion screws to between 25
R and 30 lbf in (0.282 and 0.339 mdaN) and lock them together with 0.028 in (0.7 mm) dia non-corrodible steel wire.

(8) Turn down the joint sleeve over each end of the fan, ensure that the joint sleeves are centrally positioned at each joint and secure them with the worm drive clips. Lock the clips with 0.028 in (0.7 mm) dia non-corrodible steel wire.

(9) Ensure that the electrical plug and receptacle are clean and undamaged. Connect the plug to the receptacle and clip the cable to the floor support.

(10) Check that the bonding lead attachments are clean and connect the lead to the fan casing, in accordance with 20-27-11, with a bolt, washer and nut. Torque load the nut to between 30 and 40 lbf in (0.34 and 0.45 mdaN).

(11) Remove the safety clips and reset the circuit breakers.

(12) Operationally test the fan, as detailed in 21-21-22, Adjustment/Test.

(13) Fit the access door and ensure that the handle stows flush.

FANS (FORWARD VESTIBULE RACKS SUPPLY) - ADJUSTMENT/TEST

1. General

Two fans, one on each side of the aircraft, supply air for cooling the forward electronics racks. Access is gained by removing door 123 BB.

2. Operational Test

A. Check that electrical power is available on the equipment bay cooling panel at the 3CM station. The normal ground position of the fan controls is as shown in (Ref. Fig. 501).

B. Remove access door 123 BB and check aurally that the LH and RH forward supply fans are running.

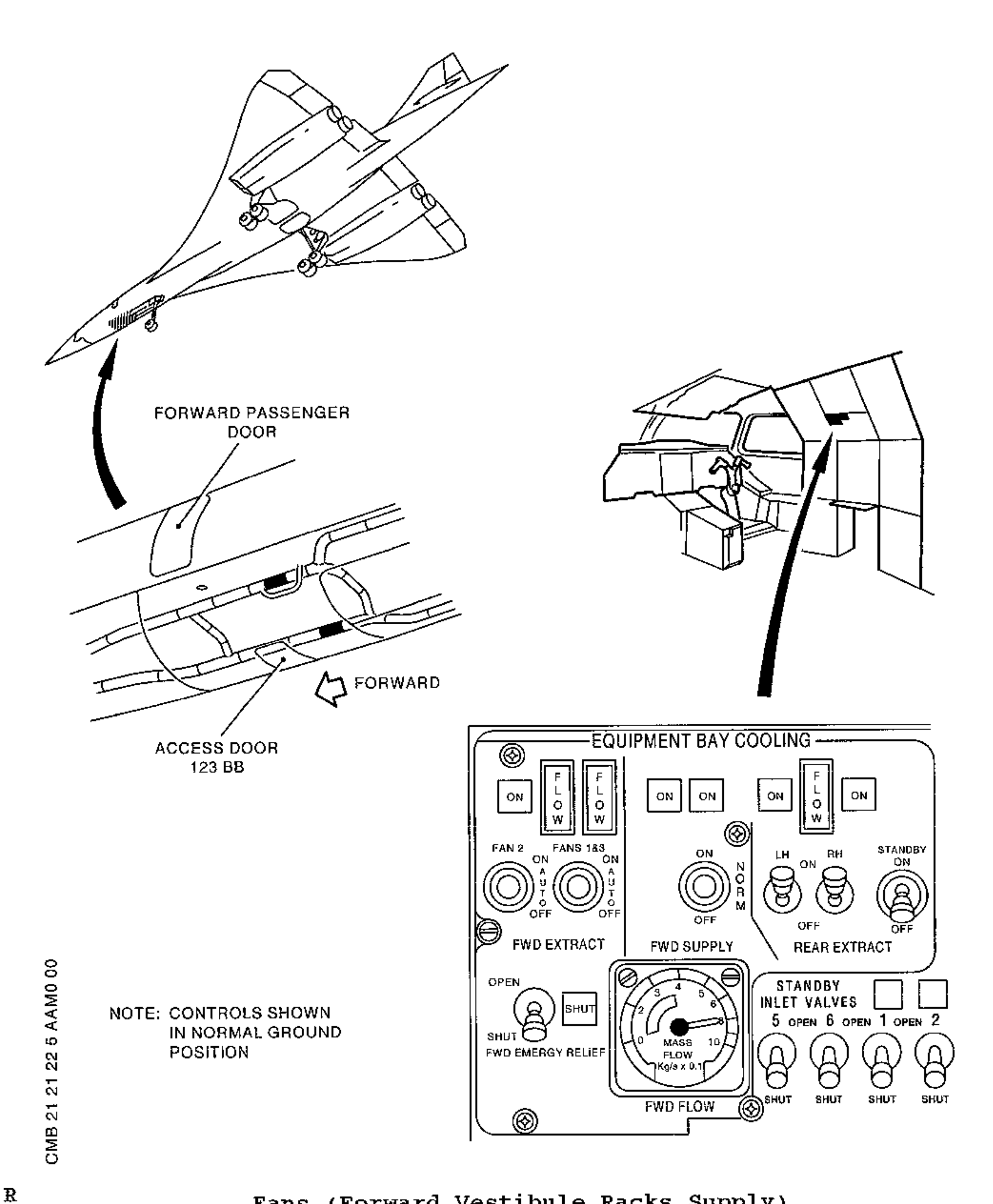
C. Select the FWD SUPPLY fan switch to "OFF" and check that the magnetic indicator registers OFF. Check aurally that both fans stop.

D. Select the FWD SUPPLY fan switch to "LH" and that the magnetic indicator registers ON. Check aurally that the LH fan starts.

E. Select the FWD SUPPLY fan switch to "NORM" and check aurally that the RH fan starts.

F. Replace access door 123 BB.

G. Check that controls on the equipment bay cooling panel are in the normal ground position.



R

Fans (Forward Vestibule Racks Supply)
Figure 501

NON-RETURN VALVE (FORWARD VESTIBULE RACKING SUPPLY)-REMOVAL/INSTALLATION

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED IN 24-00-00.

1. General

A flap-type non-return valve is located immediately upstream of each of the two forward vestibule racking supply fans. Access is gained by removing door 123 BB. Before removing a valve, the associated fan must be electrically isolated to prevent the ingestion of foreign matter into the system.

2. Non-return Valve (Ref. Fig. 401)

A. Equipment and Materials

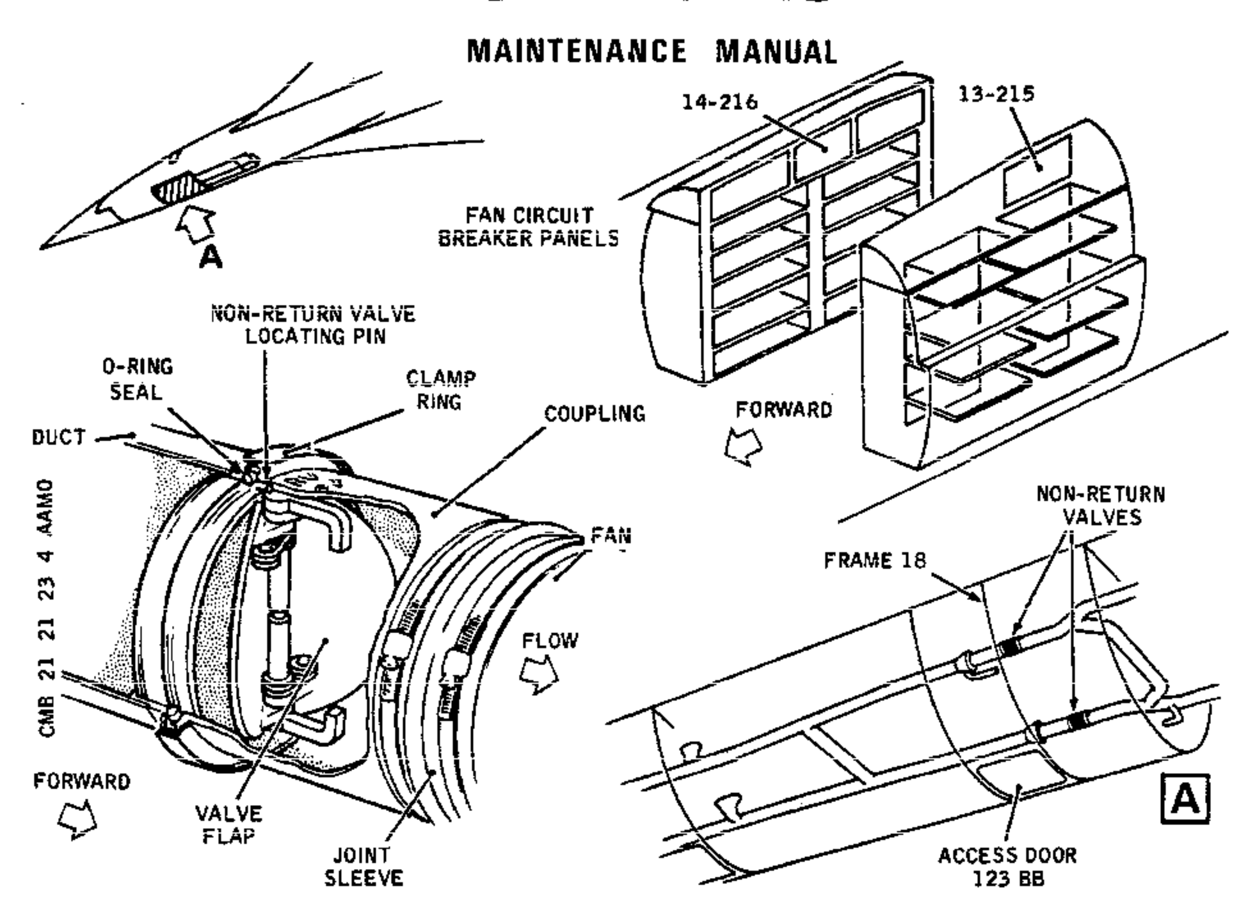
DESCRIPTION	PART NO.
Circuit breaker Safety clip	-
Non-corrodible wire-0.028 in (0.7mm) dia.	-

B. Prepare to Remove Non-return Valve (NRV)

(1) Electrically isolate the fan associated with the NRV to be removed by tripping the relevant circuit breaker listed below. Fit a safety clip.

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
R	LH FWD SUPPLY FAN SUP & CONT	13-215	1H1181	A 1
R	RH FWD SUPPLY FAN SUP & CONT	14-216	2H1181	A20

(2) Remove access door 123 BB.



Non-Return Valves (Forward Vestibule Racking Supply) - Installation
R Figure 401

C. Remove NRV

(1) Loosen the worm-drive clip securing the joint sleeve to the coupling; turn the joint sleeve back clear of the coupling.

(2) Loosen the clamping ring securing the duct to the coupling.

(3) Manipulate the coupling and the NRV clear of the duct. Remove and discard the O-ring seal. Fit suitable blank covers to the exposed ends of the fan and the duct. Remove the NRV from the coupling.

D. Install NRV

(1) Remove the blank covers from the fan and from the duct. Ensure that the duct apertures are clean and unobstructed. Check that the NRV flaps can be opened freely and, when released,

close under spring pressure.

(2) Position the NRV in its associated coupling so that the NRV locating pin engages the indent in the coupling.

(3) Fit a new O-ring seal to the duct flange and manipulate the NRV and coupling assembly into position; ensure that the O-ring seal is seated correctly.

(4) Rotate the coupling and NRV assembly until the stencilled word 'TOP' is uppermost; secure the duct and coupling with the clamp ring.

(5) Turn the joint sleeve down over the coupling, and secure it with a worm-drive clip.

(6) Lock the worm-drive clip and the clamping collar with 0.028 in (0.7mm) dia non-corrodible steel wire.

(7) Remove the safety clip and reset the circuit breaker.

R (8) Operationally test the air extraction Forward Supply
R System (Ref.21-21-00, Adjustment/Test)) and check that
R the duct joints, on either side of the NRV, do not
R leak.

(9) Fit the access door.

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NON-RETURN VALVE (FORWARD EXTRACTION) - REMOVAL/INSTALLATION

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED IN 24-00-00.

CAUTION: BEFORE REMOVING THE NON-RETURN VALVE, DISCONNECT ALL ELECTRICAL POWER TO SAFEGUARD ELECTRONIC EQUIPMENT WHILE THE COOLING AIR SYSTEM IS INOPERATIVE. DO NOT APPLY WEIGHT TO DUCTING.

1. General

The three non-return valves are located upstream of the extraction fans and are accessible under the compartment floor in zone 125/6.

2. Non-return Valve (Ref. Fig. 401)

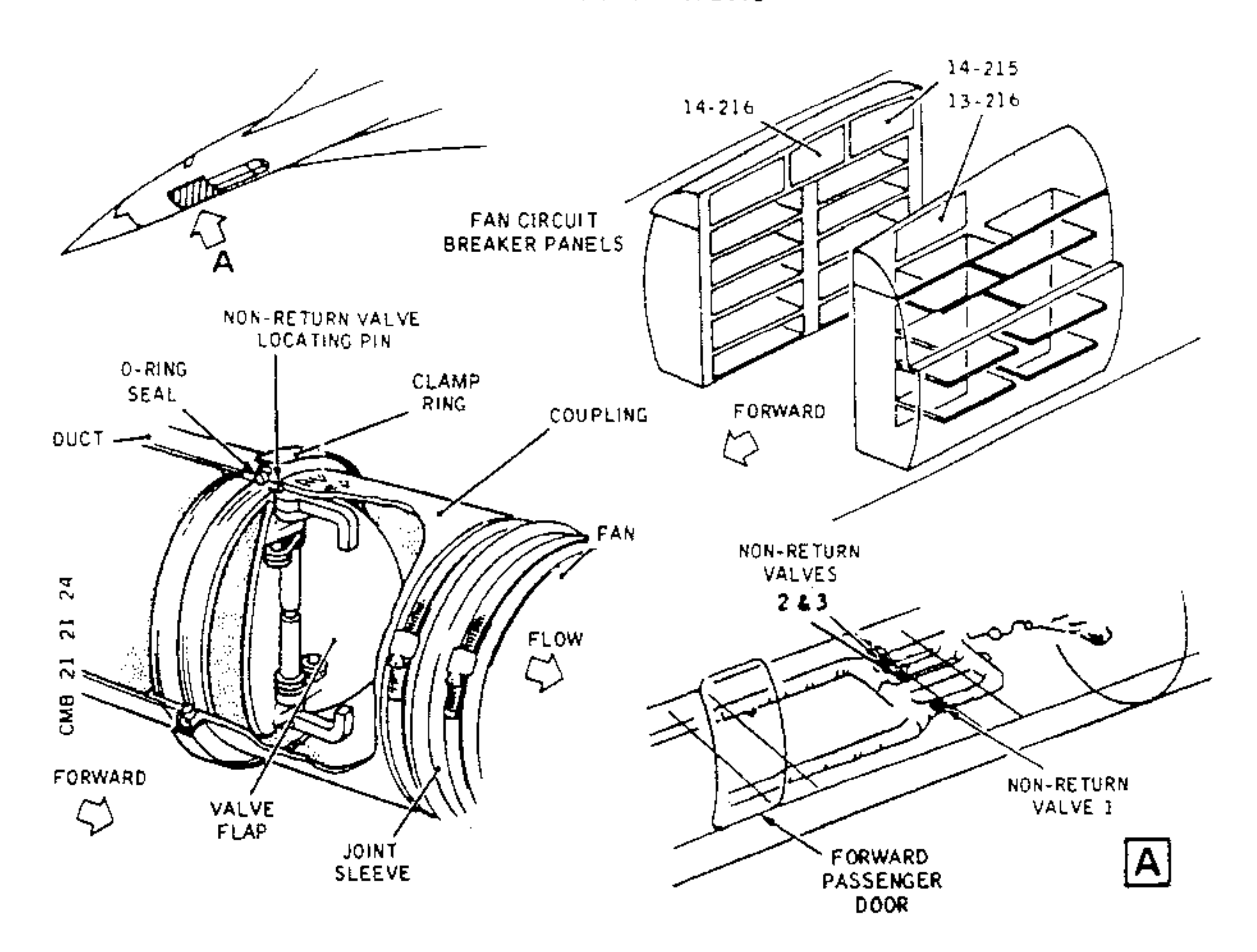
A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit breaker Safety clips	-
'O' ring seal	CSP4-ND-263
Corrosion resistant steel wire 0.028 in (0.7 mm) dia.	-

B. Prepare to Remove Non-return Valve (NRV)

(1) Electrically isolate the fan associated with the NRV to be removed by tripping the relevant circuit breakers listed below. Fit a safety clip.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
FWD SUPPLY FAN NO.1 SUP & CONT	14-215	1H1183	E3
FWD SUPPLY FAN NO.2 SUP & CONT	13-216	2H2011	D20
FWD SUPPLY FAN NO.3 SUP & CONT	14-216	2H1182	G21



Non-Return Valves (Forward Extraction)
- Installation
Figure 401

(2) Remove access door 127 BB, and 128 BB.

C. Remove NRV

(1) Loosen the worm-drive clip securing the joint sleeve to the coupling; turn the joint sleeve back clear of the coupling.

(2) Loosen the clamping ring securing the duct to the coupling.

(3) Manipulate the coupling and the NRV clear of the duct. Remove and discard the O-ring seal. Fit suitable blank covers to the exposed ends of the fan and the duct. Remove the NRV from the coupling.

D. Install NRV

(1) Remove the blank covers from the fan and from the duct. Ensure that the duct apertures are clean and unobstructed. Check that the NRV flaps can be opened freely and, when released, close under spring pressure.

(2) Position the NRV in its associated coupling so that the NRV locating pin engages the indent in the coupling.

(3) Fit a new O-ring seal to the duct flange and manipulate the NRV and coupling assembly into position; ensure that the O-ring seal is seated correctly.

(4) Rotate the coupling and NRV assembly until the stencilled word 'TOP' is uppermost; secure the duct and coupling with clamp ring.

(5) Turn the joint sleeve down over the coupling, and secure it with a worm-drive clip.

(6) Lock the worm-drive clip and the clamping collar with 0.028 in (0.7 mm) dia corrosion resistant steel wire.

(7) Remove the safety clip and reset the circuit breaker.

(8) Operationally test the air extraction Forward Supply System (Ref. 21-21-00, Adjustment/Test)) and check that the duct joints, on either side of the NRV, do not leak.

(9) Fit the access door.

OUTWARD RELIEF VALVE (FORWARD EXTRACT DUCT)-REMOVAL/INSTALLATION

1. General. (Ref. Fig. 401)

   This valve is fitted in a short branch of the extract duct underneath the passenger compartment floor in zone 125. Access is gained by removal of the appropriate floor panels.

2. Outward Relief Valve.

   A. Equipment and Materials.

DESCRIPTION	PART NO.
Torque set screwdriver	-
Torque spanner. 0-50 lbf in (0-0.565 mdaN) range.	-
Wire, chromium nickel 0.028 (0.7 mm) dia.	-

   B. Prepare.

      (1) Move the passenger seats forward or aft as required to gain access to floor panel 222 VF.

      (2) Pull the carpet aside to expose the floor panel remove and retain the countersunk bolts from the edge of the panel.

      (3) Locate the lifting tape at the edge of the panel, and pull it to raise the panel from its recess. Remove the panel.

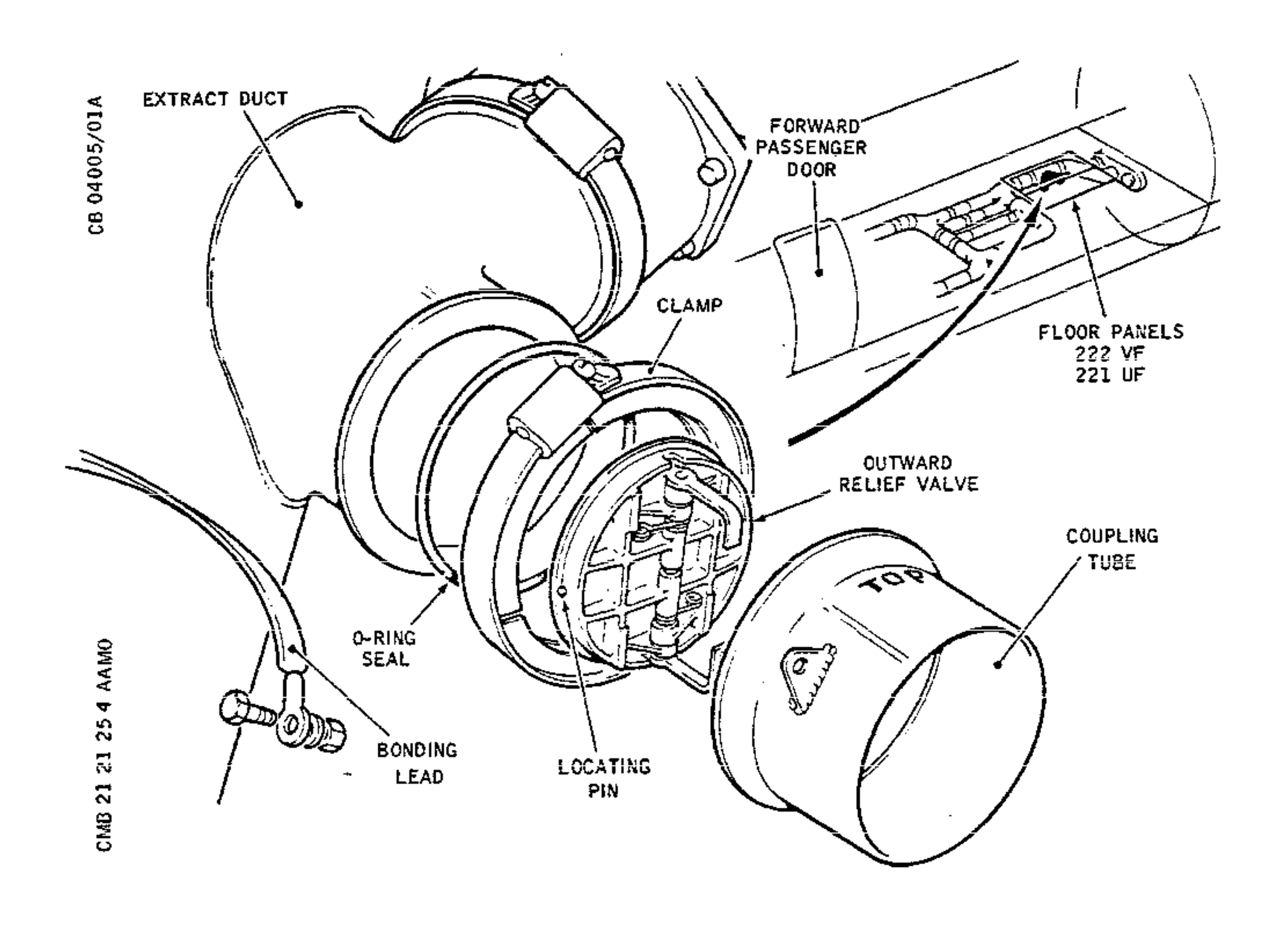
      CAUTION: DO NOT DAMAGE THE SEALING STRIPS.

   C. Remove.

      (1) Remove the nut, washer and bolt securing the bonding lead to the coupling tube.

      (2) Support the coupling tube and remove the wormdrive clamp securing the tube to the duct.

      (3) Withdraw the tube from the duct complete with the outward relief valve. Take care that the valve



Outward Relief Valve - Installation.
R Figure 401

does not fail when removing the tube. Remove the valve.

(4) Remove and discard the O-ring seal from the groove in the flange of the branch duct.

(5) If a replacement valve is not to be fitted immediately, fit a blank cover to the exposed end of the duct.

D. Install

(1) Remove the floor panel and the blank cover fitted to the duct.

(2) Ensure that the duct is clear of debris, and fit a new O-ring seal in the groove in the flange of the branch duct.

(3) Inspect the valve for freedom from damage and insert it in the flanged end of the coupling tube. Ensure that the locating pin on the side of the valve fits in the cut out in the tube flange.

(4) Position the coupling tube complete with the outward relief valve against the end of the extract duct and secure them with a wormdrive clip. Lock the clip with wire.

NOTE: TOP on the coupling tube must be uppermost to ensure that the valve hinge is vertical.

(5) Attach the free end of the bonding lead to the lug on the coupling tube, with a bolt, washer and nut. Torque load the nut to between 30 and 40 lbf in (0.339 and 0.452 mdaN).

(6) Operationally test the valve as detailed in 21-21-25, Adjustment/Test.

(7) Fit the floor panels and secure them with countersunk bolts. Torque load each bolt to between 20 and 25 lbf in (0.22 and 0.28 mdaN).

(8) Fit the carpet over the floor panels, and move the passenger seats back to their original positions.

OUTWARD RELIEF VALVE - ADJUSTMENT/TEST

1. General

The outward relief valve is fitted on a short branch duct under the floor of the forward passenger compartment. Access is through panel 222 VF.

2. Operational Test (Ref. Fig. 501)

A. Prepare to test.

(1) Move the passenger seats forward or aft as required to gain access to floor panels 222 VF and 221 UF.

(2) Pull the carpet aside to expose the floor panels and remove the countersunk securing bolts.

(3) Locate the lifting tapes and remove the floor panels.

CAUTION: AVOID DAMAGE TO THE SEALING STRIPS.

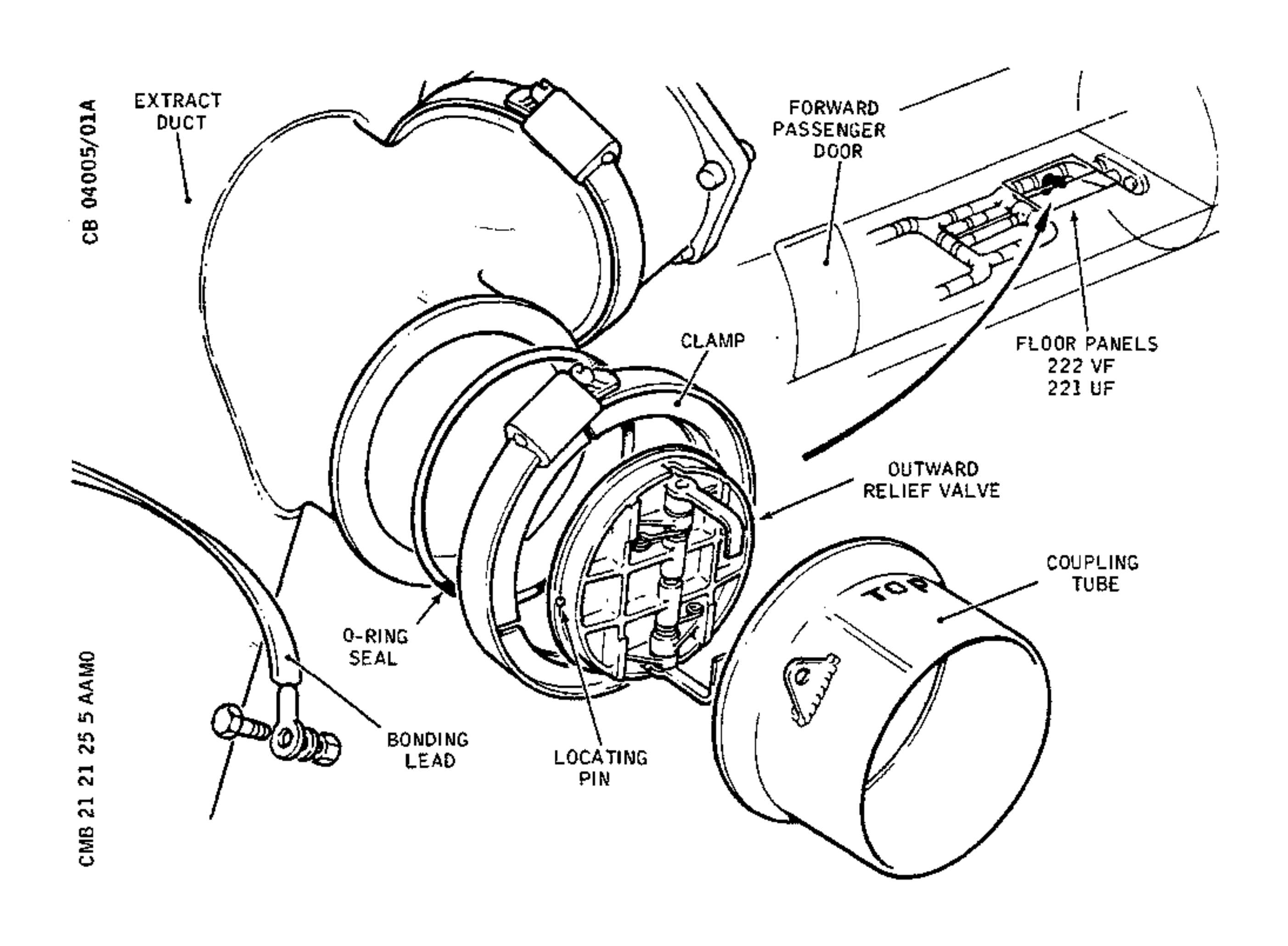
B. Test.

(1) Reach down the valve coupling tube and check the valve plates by hand for freedom of movement, spring tension and that the spring retains the valve plates fully in the closed position.

C. Conclusion.

(1) Refit the floor panel and torque load the securing bolts to between 20 and 25 lbf in (0.22 and 0.28 mdaN).

(2) Restore the carpet and passenger seats to their original position.



Outward Relief Valve
Figure 501

R

MASS FLOW SENSOR UNIT - REMOVAL/INSTALLATION

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED IN 24-00-00.

1. General

The mass flow sensor unit, which comprises a duct unit and a mass flow sensor, is fitted immediately downstream of the extract fans in zone 125 beneath the passenger compartment floor. The sensor can be removed without disturbing the duct unit, and access is gained by removal of the appropriate floor panel.

2. Mass Flow Sensor

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit breaker safety clips	-
Torque spanner (0-50 lbf in; 0-0.565 mdaN range)	-
Torque set screwdriver	-
Wire, non-corrodible steel 0.028 in (0.7 mm) dia	-

B. Prepare to Remove Mass Flow Sensor

(1) Electrically isolate the sensor by tripping circuit breaker D 201 on panel 1-213, map ref. G10.

(2) Move the passenger seats forward or aft as required to gain access to floor panels 222 VF and 221 UF.

(3) Pull the carpet aside to expose the floor panels, and remove and retain the countersunk bolts around the edges of the panels.

(4) Locate the lifting tapes at the edge of each panel, and pull them to raise the panel from its recess. Remove the panels.

CAUTION: DO NOT DAMAGE THE PANEL SEALING STRIPS.

C. Removal

(1) Disconnect the electrical plug from the sensor.

(2) Remove the seven bolts and washers from the flange of the sensor, and remove the sensor complete with its gasket. Discard the gasket.

(3) If a replacement sensor is not to be fitted immediately, fit a blank cover over the sensor aperture in the duct, and temporarily fit the floor panels.

D. Installation

(1) Comply with the electrical safety precautions.

(2) Remove the floor panels, and the blank cover from the duct.

(3) Ensure that the duct is clear of debris, and place a new gasket in position.

(4) Visually inspect the sensor for freedom from damage.

(5) Place the sensor in position, and secure it with seven washers and bolts. Torque load each bolt to between 33 and 44 lbf in (0.373 and 0.497 mdaN) and lock with wire.

(6) Connect the electrical plug to the sensor, ensuring that the plug and receptacle mating surfaces are clean and undamaged.

B (7) Carry out Operational Test-Main Fans (Ref. 21-21-19 Adjustment/Test).

(8) Fit the floor panels and secure them with countersunk bolts. Torque load each bolt to between 20 and 25 lbf in (0.22 and 0.28 mdaN).

(9) Fit the carpet over the floor panel, and move the passenger seats back to their original positions.

3. Duct Unit

A. General

The removal and installation of the duct unit is effected in accordance with the instructions given in 21-21-00, Removal/Installation, after carrying out the preparatory procedure given in para.2.B. When installing the duct

unit, ensure that the duct is correctly positioned by aligning the location lines on the duct with the arrow on the mounting bracket. Complete the installation by making the electrical connections to the sensor, operationally testing the installation and refitting the floor panels and carpet as detailed in para.2D.

INWARD RELIEF VALVE - REMOVAL/INSTALLATION

1. General

This valve is fitted on a short branch duct of the extract duct underneath the passenger compartment floor in zone 125. Access is gained by removal of the appropriate floor panel.

2. Inward Relief Valve (Ref. Fig. 401)

A. Equipment and Materials

DESCRIPTION	PART NO.
Torque spanner 0 to 50 lbf in (0 to 0.565 mdaN) range	-
Torque set screwdriver	-
Wire, chromium-nickel 0.028 in (0.7 mm) dia.	-

B. Prepare to Remove Inward Relief Valve

(1) Move the passenger seats forward or aft as required to gain access to floor panels 222VF and 222UF.

(2) Pull the carpet aside to expose the floor panel, and remove the countersunk bolts from the edge of the panel.

(3) Locate the lifting tapes at the edge of the panel, and pull them to raise the panel from its recess. Remove the panel.

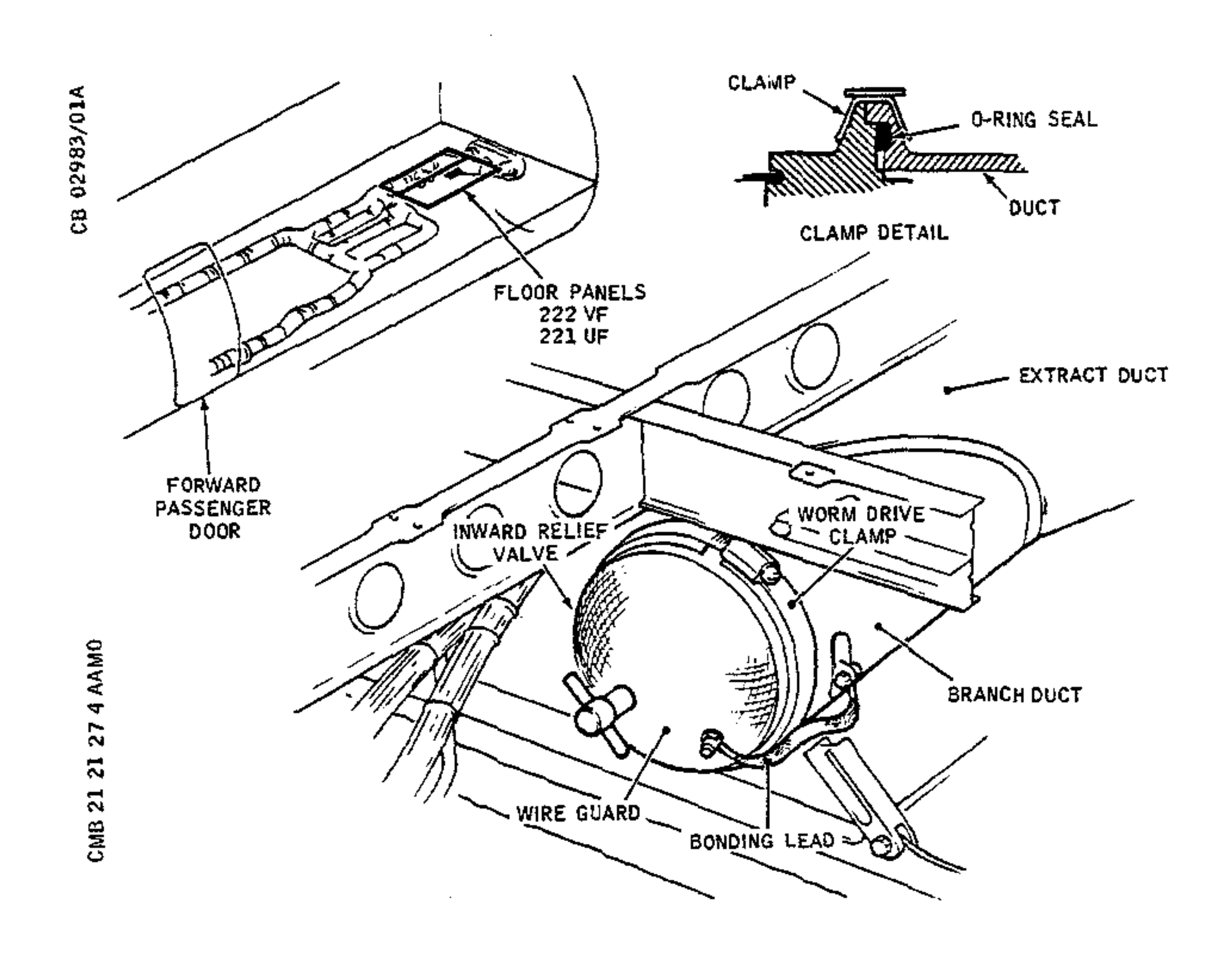
CAUTION: DO NOT DAMAGE THE SEALING STRIPS.

C. Removal

(1) Remove the nut and washer securing the bonding lead to the wire guard.

(2) Loosen the wormdrive clamp securing the valve to the duct. Slide the clamp back over the duct.

(3) Withdraw the valve from the duct, and remove the



Inward Relief Valve - Installation
Figure 401

O-ring seal from the groove in the flange of the branch duct. Discard the seal.

(4) If a replacement valve is not to be fitted immediately, fit a blank cover to the open end of the duct and fit the floor panel.

D. Installation

(1) Remove the floor panel and the blank cover fitted to the duct.

(2) Ensure that the duct is clear of debris, and fit a new O-ring seal in the groove in the flange of the duct.

(3) Remove the blank cover from the valve and inspect the valve for freedom from damage; ensure that the wire mesh guard is clear of foreign particles.

(4) Align the locating spigot on the valve body with the locating slot in the duct flange, and slide the valve into the duct until the mating flanges contact.

(5) Slide the wormdrive clamp over the mating flanges of the duct and the valve. Secure the flanges with the clamp, and lock the clamp with wire.

(6) Attach the free end of the bonding lead to the bonding stud on the valve wire guard with the nut and washer. Torque load the nut to between 30 and 40 lbf in (0.339 and 0.452 mdaN) and lock with wire.

(7) Operationally test the valve as detailed in 21-21-27, Adjustment/Test.

(8) Fit the floor panels and secure them with countersunk bolts. Torque load each bolt to between 20 and 25 lbf in (0.22 and 0.28 mdaN).

(9) Fit the carpet over the floor panels, and move the passenger seats back to their original positions.

INWARD RELIEF VALVE - ADJUSTMENT/TEST

1. General

The inward relief valve is fitted on a short branch duct under the floor of the forward passenger compartment. Access is through panels 222 VF and 221 UF.

2. Operational Test (Ref. Fig. 501)

A. Prepare to test inward relief valve.

(1) Move the passenger seats forward or aft as required to gain access to floor panels 222 VF and 221 UF.

(2) Pull the carpet aside to expose the floor panels and remove the countersunk securing bolts.

(3) Locate the lifting tapes and remove the floor panels.

CAUTION: AVOID DAMAGE TO THE SEALING STRIPS.

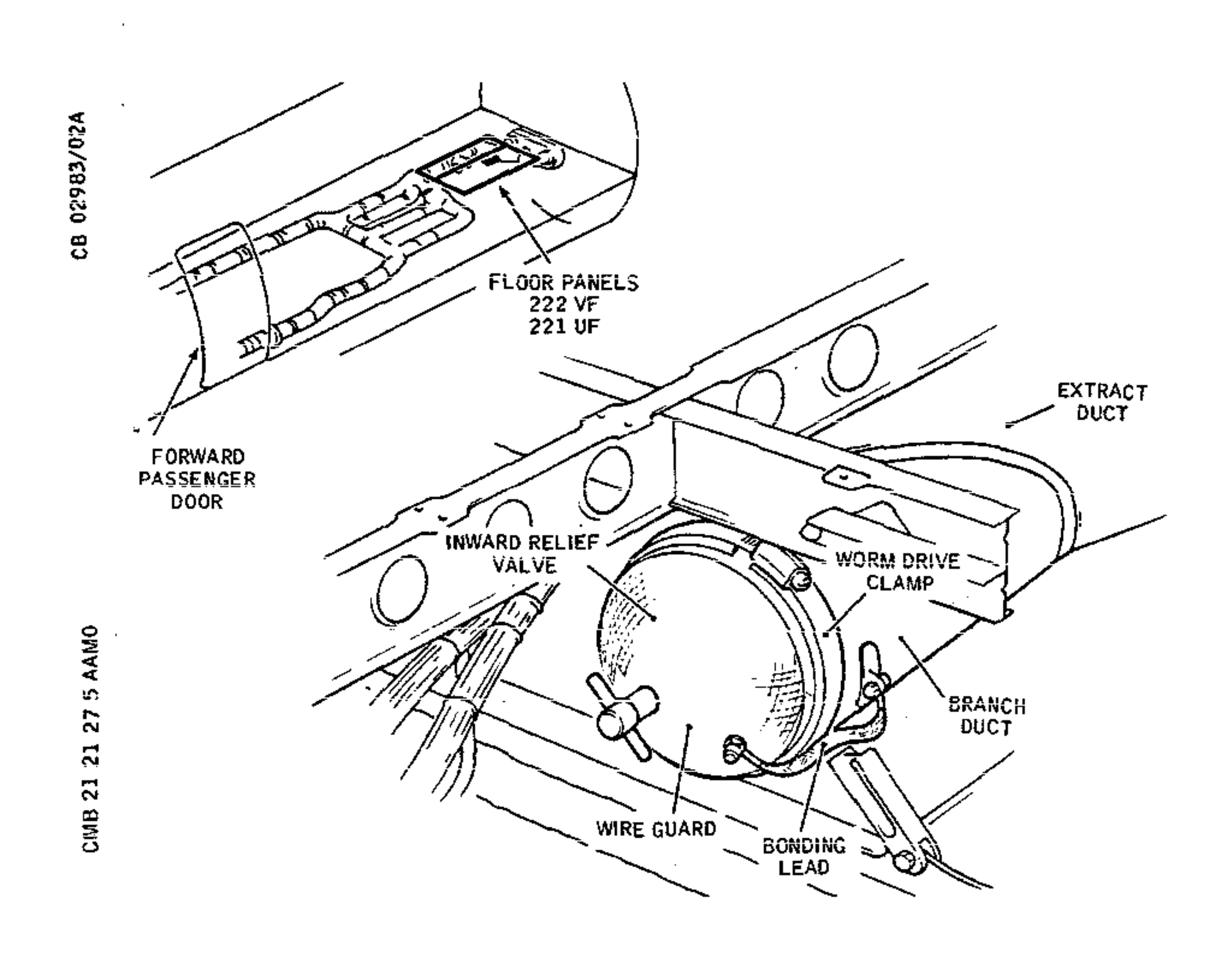
B. Test inward relief valve

(1) Insert a suitable probe through the wire guard and check the valve plates for freedom of movement. Open each flap fully and check that when slowly released, the flaps return to the closed position without sticking or binding.

C. Conclusion

(1) Refit the floor panels and carpet and restore the passenger seats to their original position.

Printed in England



R Inward Relief Valve
Figure 501

FILTERS (AIR SUPPLY FORWARD RACKS) - REMOVAL/INSTALLATION

1. General

There are two disposable filters in the forward racking air supply ducts beneath the passenger compartment floor in zones 125 and 126. Access is gained by removing the appropriate
R floor panels and the ground pressure relief valve. The fans
R downstream of the filters must be immobilized during removal
R and installation to prevent the ingestion of debris should they
R be inadvertently operated.

2. Filters (Ref. Fig. 401)

A. Equipment and Materials

	DESCRIPTION	PART NO.
R R	Circuit breaker safety clips	-
R R R R R	Torque spanner 0 to 50 lbf in (0 to 0.565 mdaN) range	-

B. Prepare to Remove Filters

R (1) Remove the ground pressure relief valve (Ref.21-
R 36-11).

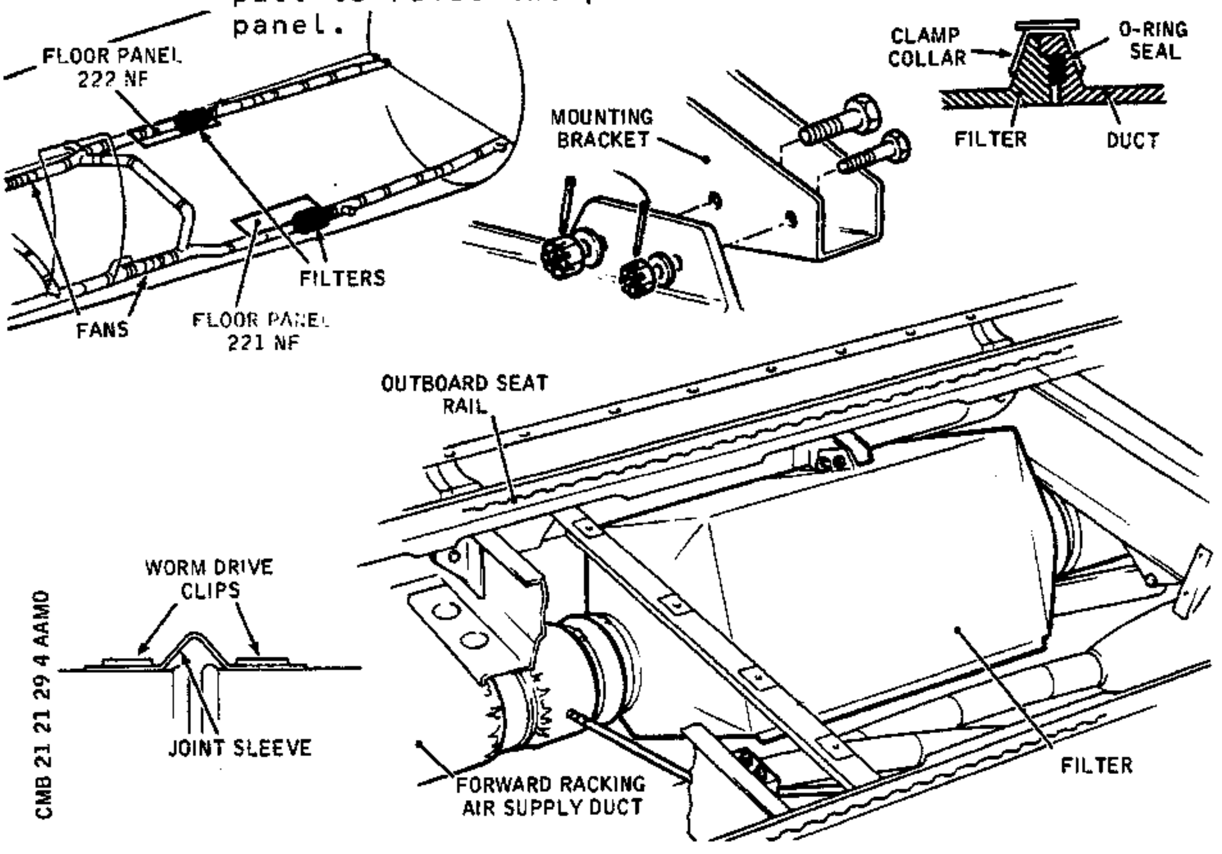
R (2) Electrically isolate the racking supply fans by tripping the circuit breakers. Fit safety clips.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Fan - Racking supply LH	13-215	1H1181	A 1
Fan - Racking supply RH	14-216	2H1181	A20

R (3) Move the passenger seats forward or aft as required to gain access to the relevant floor panel.

R (4) Pull the carpeting aside to expose the floor panel, and remove and retain the countersunk bolts around the edge of the panel.

R (5) Locate the lifting tape at the edge of the panel, and pull to raise the panel from its recess. Remove the panel.



Filter - Installation
Figure 401

C. Removal

(1) Remove the clamping collar securing the rear end of the filter to the duct.

(2) Remove the worm-drive clips securing the joint sleeve at the forward end of the filter, and turn the joint sleeve back.

(3) Support the filter, and remove the split pins, nuts washers and bolts, securing it to the mounting bracket attached to the underside of the outboard seat rail. Remove the filter, and discard the O-ring seal,

fitted in the groove of the rear duct flange.

(4) If a replacement filter is not to be fitted immediately, fit blank covers to the exposed ends of the duct, and fit the floor panels.

D. Installation

(1) Remove the blank covers fitted to the ducting and the filter ports. Ensure that the ducts and the filter are free of debris.

(2) Fit a new O-ring seal in the groove of the rear duct flange.

(3) Position the filter and temporarily support it; secure it to the mounting bracket with bolts, washers and nuts. Torque load each nut to between 25 and 30 lbf in (0.283 and 0.339 mdaN) and lock it with a split pin. Remove the temporary support.

(4) Position the clamping collar over the mating flanges of the filter and the rear duct. Tighten the collar to secure the filter to the duct.

(5) Pull the joint sleeve over the forward end of the filter, and secure the sleeve with two worm-drive clips to the filter and the duct.

R (6) Refit the ground pressure relief valve (Ref.21-
R 36-11).

R (7) Remove the safety clips and set the supply fans circuit breakers.

R (8) Check that the cabin pressure control valve switches on panel 1-214 are selected NORMAL and that the discharge valve position indicators show OPEN.

R (9) Check that the switches and indicators on the equipment bay cooling section of panel 2-214 are at the normal ground state.

R (10) Fit the floor panel into its recess, and secure it with countersunk bolts. Torque load each bolt to between 20 and 25 lbf in (0.22 and 0.28 mdaN).

R (11) Refit the carpet over the floor panel, and move the passenger seats back to their original positions.

FILTERS (AIR SUPPLY FORWARD RACKS) - ADJUSTMENT/TEST

1. General

There are two disposable filters in the air supply ducts to the forward equipment racks. Access is gained by removing passenger compartment floor panels 221 NF and 222 NF.

2. Tools and Equipment Required

DESCRIPTION	PART NO.
Water Manometer	Combustion Instruments VR100/E2 or similar

R 3. Functional Test (Ref. Fig. 501)

A. Prepare to test forward air supply filters

(1) Check that the passenger compartment doors are open, or that a ground air supply is connected (Ref. 12-14-21).

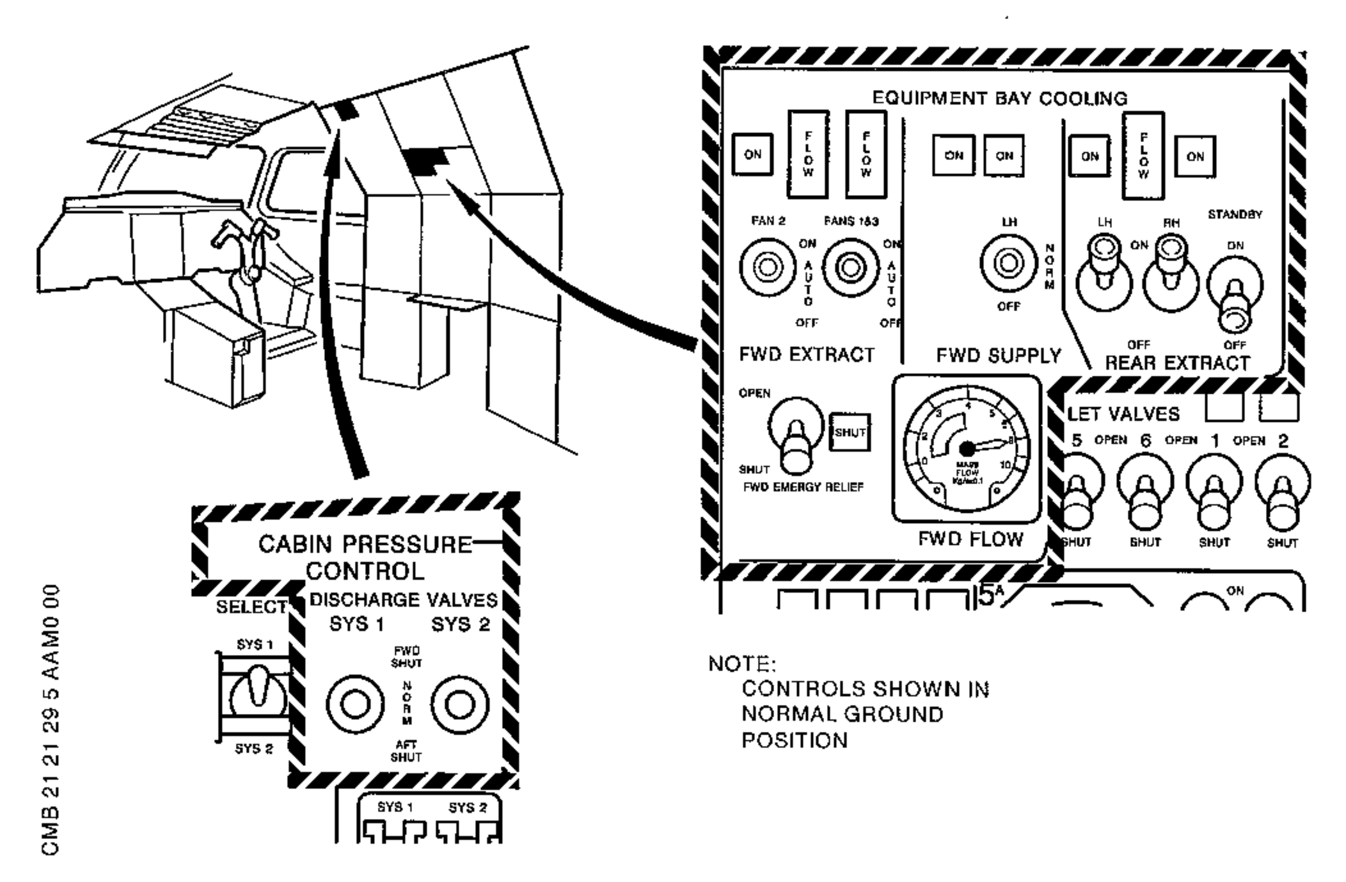
(2) Make available electrical ground power (Ref. 24-41-00, Servicing).

(3) Check that the cabin pressure control valve switches are selected NORMAL and that the discharge valves are open.

(4) Check that the switches and indicator on the equipment bay cooling fan panel are at the normal ground state and that the forward supply and extraction fans are running.

(5) Move the passenger seats forward or aft as required to give access to floor panels 221 NF and 222 NF.

(6) Pull the carpeting aside and remove the countersunk bolts securing the floor panels. Locate the lifting tapes and remove the floor panels.



R Air Extraction - Controls and Indicators
Figure 501

B. Test forward air supply filters (Ref. Fig. 502)

(1) Remove the rubber blanking caps from the static test points of one filter and attach the manometer connections. Check that the manometer registers not more than 7 in (178 mm) W.G. (Water Gauge).

(2) Disconnect the manometer and replace the rubber blanking caps.

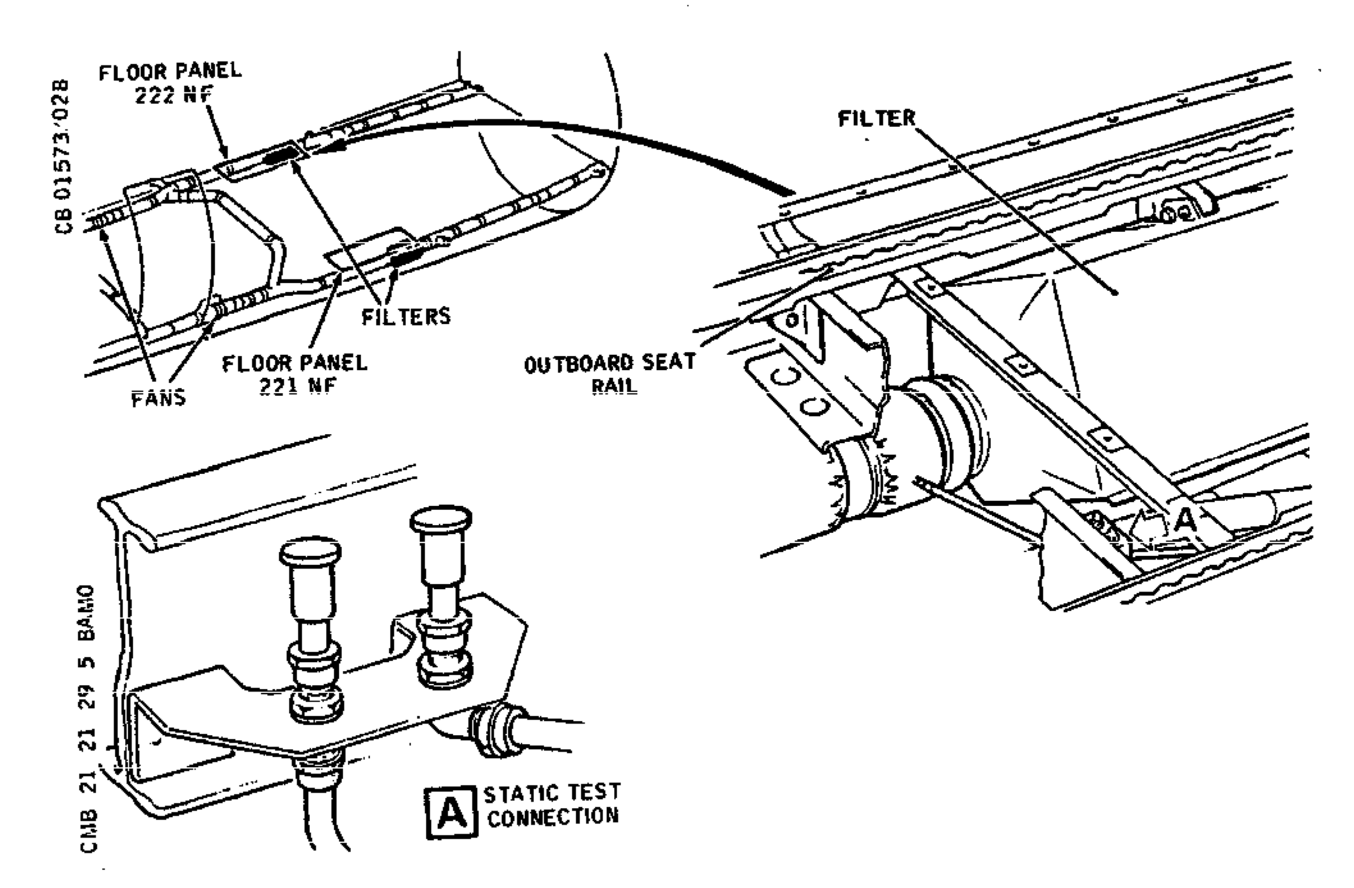
(3) Repeat the test on the second filter.

C. Conclusion

(1) Check that all static test point caps are in place.

(2) Replace floor panels, carpeting and passenger seats.

(3) Check that the switches on the equipment bay cooling panel and the cabin pressure control panel are in the normal ground position.



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R Filter - Installation
R Figure 502

(4) Switch off and disconnect electrical ground power (Ref. 24-41-00, Servicing).

(5) Switch off and remove ground air supply (Ref. 12-14-21).

FILTERS - REAR VESTIBULE ELECTRICAL RACKS - REMOVAL/INSTALLATION

1. General

A disposable filter is fitted in each of the air intakes of the rear vestibule electrical racks. Four filters are in the left-hand rack and four in the right-hand rack. The filters can be removed after removing the covers which hold them in position.

2. Filter

A. Removal

(1) Support the filter cover, and remove the eight screws and washers. Remove the cover.

(2) Remove the filter.

B. Installation

(1) Ensure that the filter aperture is clean and clear of debris.

RB (2) Place the filter in the aperture; ensure that the mesh
RB guard faces the rack (aft side).

(3) Place the cover over the filter and secure the cover with the screws and washers.

FILTERS (REAR VESTIBULE ELECTRICAL RACKS) - INSPECTION/CHECK

1. General

Four disposable air filters are located on the forward bulkhead of each rear equipment rack. Each filter is secured by a cover which is retained by eight pan-head screws. An identification label, complete with direction-of-flow arrow, is attached to the edge of the filter.

2. Inspection/Check

A. Prepare

(1) Remove the filter (Ref.21-21-52, Removal/Installation).

B. Inspect

(1) Visually inspect the filter frame for damage and cleanliness.

R (2) Ensure that the filter element is intact, and that
R dust has not penetrated through the element.
R Carefully brush off dust and lint from the up-
R stream face of the element.

(3) Ensure that the self-adhesive identification label is intact and legible.

Printed in England

R FANS (REAR RACK EXTRACTION) - REMOVAL/INSTALLATION

WARNING: OBSERVE THE ELECTRICAL PRECAUTIONS DETAILED IN 24-00-00.

R CAUTION: THE SERVICEABLE FANS MUST REMAIN RUNNING DURING A FAN
R REMOVAL TO MAINTAIN THE COOLING OF ELECTRONIC EQUIPMENT.
R ALTERNATIVELY DISCONNECT ALL ELECTRICAL POWER. DO NOT
R APPLY WEIGHT TO DUCTING:

1. General

Three electrically operated fans extract air from the rear vestibule racks through a non-return valve in each fan
R inlet. The fans, coupled to the junction duct, are installed
R beneath the rear baggage compartment floor. Access is gained
R through the appropriate floor panel in Zone 243. The fans for normal use lie to left and right of the centre line of the aircraft; the standby fan is angled to the left of these.

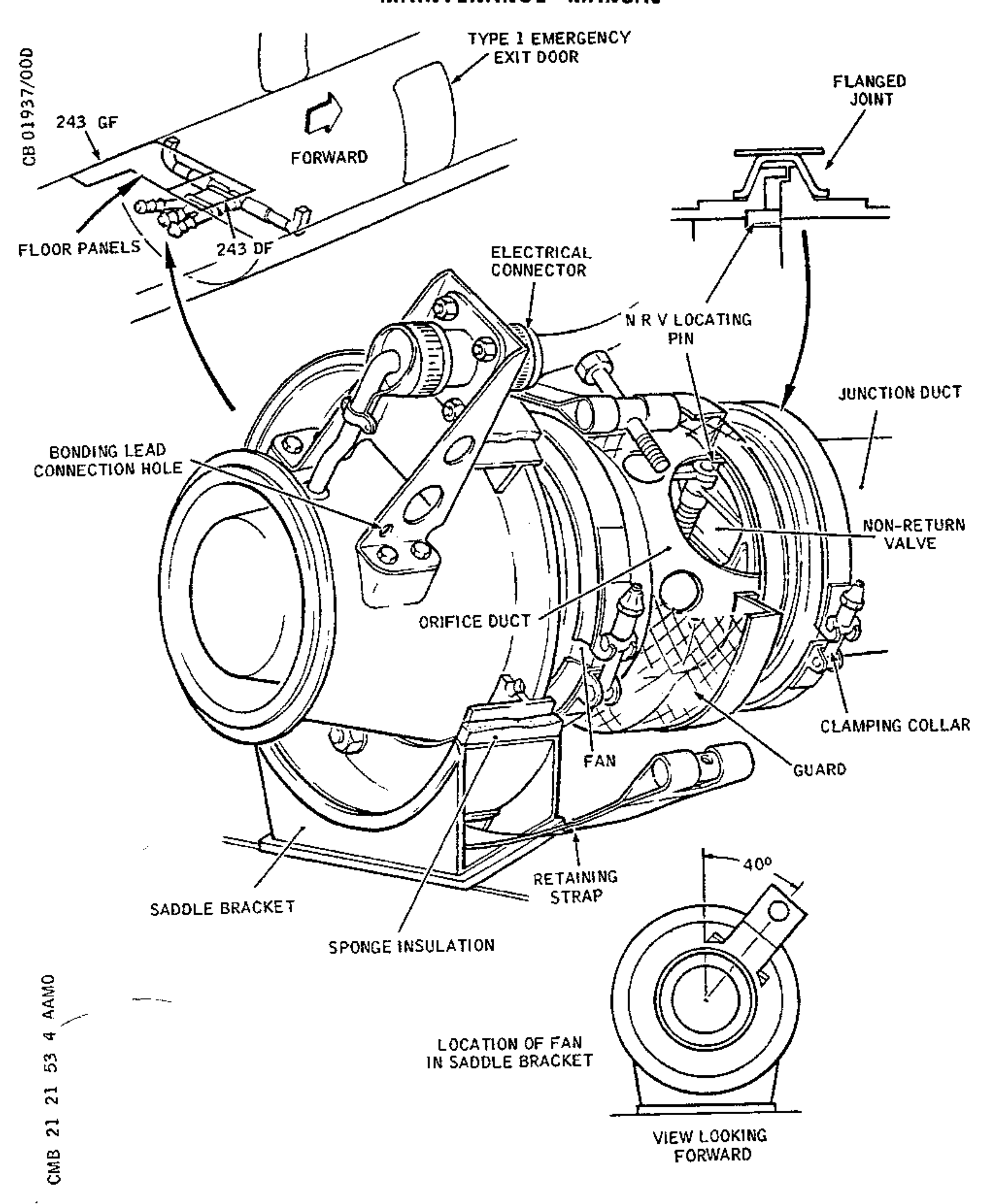
R 2. Fan - Rear Rack Extraction (Ref. Fig. 401)

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit breaker safety clips	-
Non-corrodible steel wire, 0.028 in (0.7 mm) dia.	-
Torque spanner (0 to 40 lbf in; 0 to 0.45 mdaN range)	-

R B. Prepare to Remove Fan

(1) Electrically isolate the fan by tripping the
R circuit breaker of the fan to be removed. Fit
R safety clip.



Fan - Installation
Figure 401

R

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH REAR RACK EXTRACT FAN SUP & CONT	13-215	1H1184	C 1
REAR FLOW & LH FWD AIR SUP & FAN IND	5-213	H1186	C 9
RH REAR RACK EXTRACT FAN SUP & CONT	14-216	2H1184	B 20
COOLING FANS & LH FWD DUCT FLOW IND	5-213	H1187	C 8
REAR RACK STBY EXTRACT FAN SUP & CONT	2-213	H1185	E17

(2) Remove the relevant floor panel; panel 243DF for the main fans and 243GF for the standby fan.

C. Remove Fan

(1) Disconnect the electrical plug from the fan.

(2) Remove the clamping collar that secures the fan duct to the orifice duct.

(3) Loosen the bolt securing the fan retaining strap.

(4) Disconnect the bonding lead from the electrical socket mounting bracket and remove the fan.

(5) Remove the sponge insulation strip, from the saddle bracket.

(6) Discard the O-ring seal, when fitted, and fit blank cover to the exposed duct.

D. Install Fan

RB (1) Comply with the electrical safety precautions. Remove blank
RB cover from duct.

RB (2) Check that the fan NRV flaps are clean, can be opened freely
RB and close under spring pressure when released.

RB (3) Wrap a replacement sponge insulation strip round the fan mounting ring and position the fan on the saddle bracket. Check that the flow direction arrow on the fan is pointing rearward.

RB (4) Assemble the fan to the orifice duct, flange to flange without using a seal and secure with the clamping collar. Torque load the clamping collar to 45-50 lbf/in (0.508 - 0.565 mdaN) and wirelock with 0.28 in (0.7 mm) dia wire.

RB (5) Position the strap around the fan, ensuring that the insulation sponge is evenly disposed beneath the strap. Secure the strap with the bolt and torque load it to 25 lbf in (0.28 mdaN). Wirelock the bolt 0.028 in (0.7 mm) dia wire.

RB (6) Secure the bonding lead to the electrical socket mounting bracket with a bolt, nut and washer (Ref. 20-27-11). Torque load the nut to 30 - 40 lbf in (0.34 - 0.45 mdaN).

RB (7) Ensure that the electrical plug and receptacle are clean and undamaged; connect the plug to the fan.

RB (8) Remove the safety clips and reset the circuit breaker previously tripped.

RB (9) Operationally test the fan as detailed in 21-21-53, Adjustment/Test.

RB (10) Fit the floor panel.

FANS AND NON-RETURN VALVES (REAR VESTIBULE RACKING EXTRACTION) - ADJUSTMENT/TEST

1. General

Three extraction fans draw air through the rear equipment racks and discharge it into the under floor space. Loss of air flow is detected by a pressure switch which operates at approx. 50 per cent normal flow.

The operational tests as written are suitable following fan change together with visual and manual check of the NRV's. A functional test without examination of the NRV's must include a check of shelf static pressures Ref. 21-21-00, Adjustment/Test.

R 2. Operational Test, LH and RH Fans (Ref. Fig. 501)

A. Prepare to test LH and RH rear extract fans.

(1) Check that the passenger compartment doors are open, or that a ground air supply is connected (Ref. 12-14-21).

(2) Make available electrical ground power (Ref. 24-41-00, Servicing).

(3) Check that the switches and indicator on the equipment bay cooling panel are at the normal ground state.

(4) Press the filament test push switch on panel 6-214 and check that the FLOW caption filaments light.

(5) Test the ground call horn by pressing the pilot's GRND CALL button on roof panel 4-211.

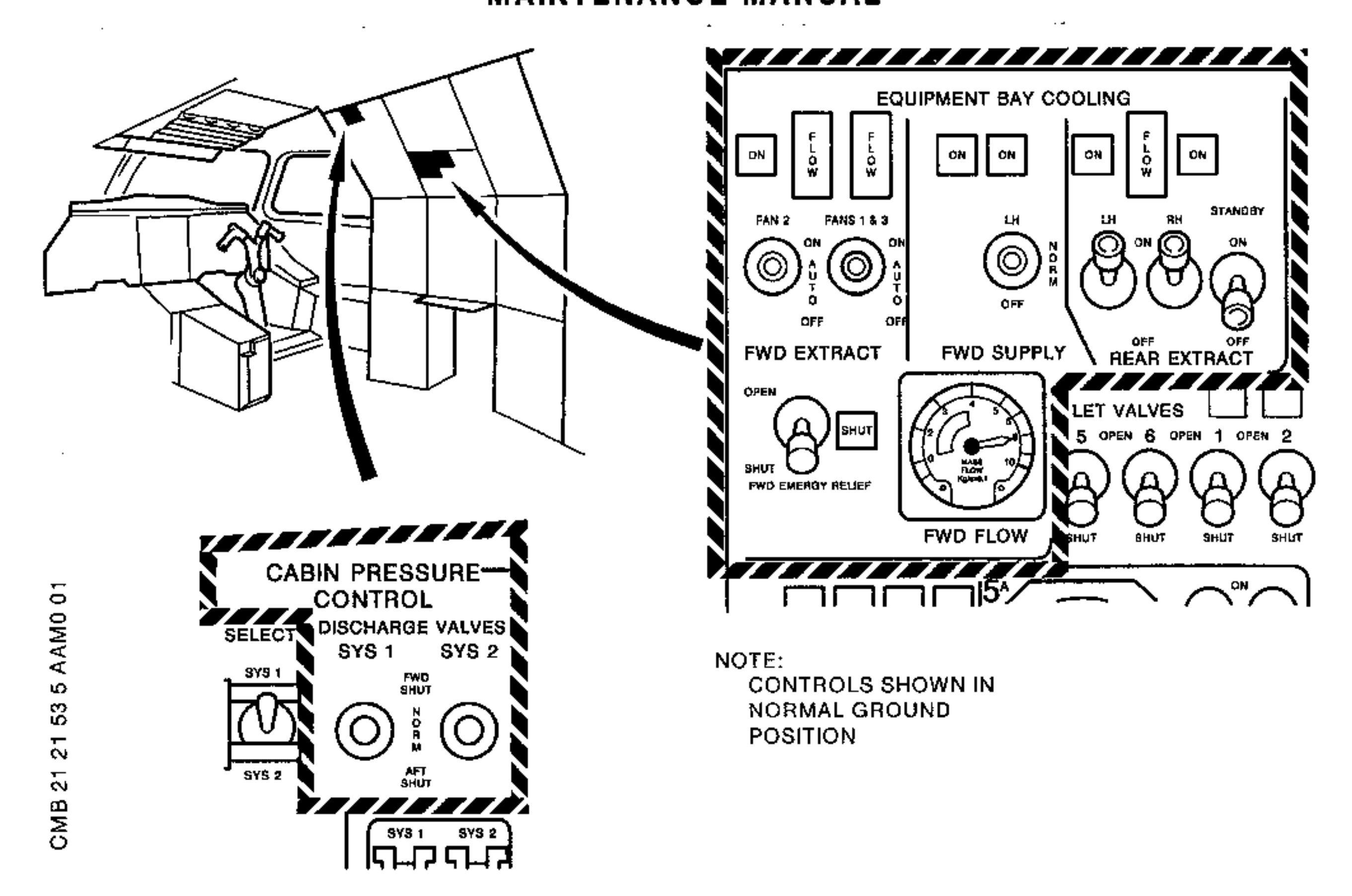
B. Test LH and RH rear extract fans.

(1) Press the REAR EXTRACT FLOW caption (to simulate fan failure). Check that the flow caption is illuminated and that there is an AIR master warning. Release the REAR EXTRACT FLOW caption and check that the caption light is extinguished and that the AIR master warning is cancelled.

R

(2) Switch "OFF" both fans and check that the magnetic indicators show OFF, the FLOW caption light comes on and, after 5-6 seconds, the ground call horn sounds.

NOTE: If the horn does not sound after 10 seconds, fan circulation should be restored.



R Air Extraction - Controls and Indicators
Figure 501

(3) Switch "ON" the LH fan and check that the magnetic indicator shows ON, the FLOW caption light goes out and that the ground call horn is cancelled.

(4) Switch the LH fan "OFF" and the RH fan "ON". Check that the magnetic indicators change appropriately and that the FLOW caption light remains off.

(5) Switch "ON" the LH fan and check that both magnetic indicators show ON and that the FLOW caption light remains off.

R

C. Conclusion

(1) Check that the switches and indicators on the equipment bay cooling panel are at the normal ground state.

(2) Switch off and disconnect electrical ground power (Ref. 24-41-00, Servicing).

R 3. Operational Test, Standby Fan (Ref. Fig. 501)

A. Prepare to test rear extract standby fan.

(1) Check that passenger compartment doors are open, or that a ground air supply is connected (Ref. 12-14-21).

(2) Make available electrical ground power (Ref. 24-41-00, Servicing).

(3) Check that switches and indicators on the equipment bay cooling panel are at the normal ground state.

(4) Press the filament test push switch on panel 6-214 and check that the FLOW caption filaments light.

(5) Test the ground call horn by pressing the pilot's GRND CALL button on roof panel 4-211.

B. Test rear extract standby fan.

(1) Press the REAR EXTRACT FLOW caption (to simulate fan failure). Check that the FLOW caption is illuminated and that there is an AIR master warning. Release the REAR EXTRACT FLOW caption and check that the caption light is extinguished and that the AIR master warning is cancelled.

(2) Switch "OFF" the LH and RH fans and check that the magnetic indicators show OFF, the FLOW caption light comes on and, after 5-6 seconds, the ground call horn sounds.

NOTE: If the horn does not sound after 10 seconds, fan circulation should be restored.

(3) Switch "ON" the STANDBY fan and check that the FLOW caption light goes out and that the ground call horn is cancelled.

(4) Switch the STANDBY fan "OFF" and the LH and RH fans "ON" and check that the indicators display normally.

C. Conclusion

(1) Check that the switches and indicators on the equipment bay cooling panel are at the normal ground state.

(2) Switch off and disconnect electrical ground power (Ref. 24-41-00, Servicing).

(3) Switch off and remove ground air supply (Ref. 12-14-21).

NON-RETURN VALVE (REAR RACK EXTRACTION) - REMOVAL/INSTALLATION

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED IN 24-00-00.

CAUTION: BEFORE REMOVING THE NON-RETURN VALVE, DISCONNECT ALL ELECTRICAL POWER TO SAFEGUARD ELECTRONIC EQUIPMENT WHILE THE COOLING AIR SYSTEM IS INOPERATIVE. DO NOT APPLY WEIGHT TO DUCTING.

1. General

The three non-return valves are located upstream of the extraction fans and are accessible under the rear baggage compartment floor in zone 243.

2. Non-return Valve (Ref. Fig. 401)

A. Equipment and Materials

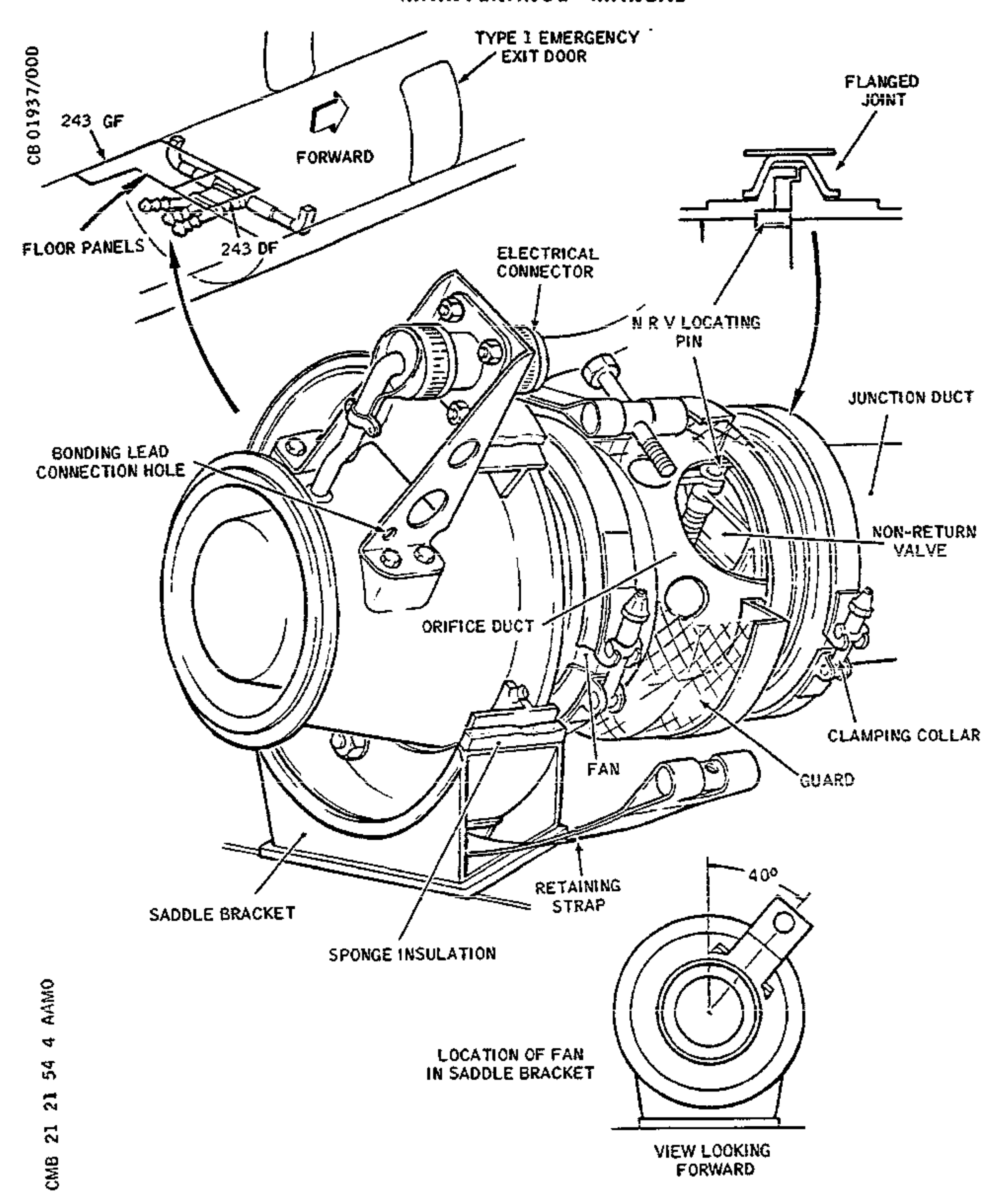
DESCRIPTION	PART NO.
Circuit breaker safety clips	-
Non-corrodible steel wire 0.028 in (0.7 mm) dia.	-
Torque spanner (0 to 40 lbf in, 0 to 0.45 mdaN range)	-

B. Prepare to Remove

(1) Disconnect electrical ground power.

(2) Trip the circuit breakers listed below as a precaution against electrical ground power being reconnected inadvertently. Fit safety clips.

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Fan and Non-return Valve Installation
Figure 401

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
LH REAR RACK EXTRACT FAN SUP & CONT	13-215	1H1184	C 1
REAR FLOW & LH FWD AIR SUP & REAR FAN IND	5-213	H1186	C 9
RH REAR RACK EXTRT FAN SUP & CONT	14-216	2H1184	B20
COOLING FANS & LH FWD DUCT FLOW IND	5-213	H1187	C 8
REAR RACK STBY EXTRT FAN SUP & CONT	2-213	H1185	E17

(3) Remove floor panel 243 DF for access to the main fan NRV's or 243 GF for the standby fan NRV.

C. Remove

(1) Disconnect the electrical plug from the fan receptacle.

(2) Remove the clamping collar securing the orifice duct to the junction duct.

(3) Loosen the bolt securing the fan retaining strap.

(4) Disconnect the bonding lead from the electrical socket mounting bracket.

(5) Remove the fan complete with orifice duct, non-return valve and sponge insulation strip, from the saddle bracket.

(6) Remove the non-return valve by withdrawing it from the orifice duct.

(7) Discard the O-ring seal, when fitted, and fit a blank cover to the exposed ducts.

D. Install

(1) Comply with the electrical safety precautions.

(2) Remove the blank covers.

(3) Insert the non-return valve into the orifice duct, with the spindle vertical, and check that the flaps open fully and close under spring pressure when release slowly.

(4) Wrap a replacement sponge insulation strip round the fan mounting ring and position the fan on the saddle bracket. Check that the flow direction arrow on the fan is pointing forward.

(5) Assemble the flanged joint without a seal. Fit the clamping collar and torque load the collar nut to 45-50 lbf in (0.508 - 0.565 mdaN). Wire-lock with 0.28 in (0.7mm) dia wire.

(6) Position the strap round the fan, ensuring that the insulation sponge is evenly disposed beneath the strap. Secure the strap with the bolt and torque load the bolt to 25 lbf in (0.28 mdaN). Wire-lock the bolt with 0.28 in (0.7 mm) dia wire.

(7) Secure the bonding lead to the electrical socket mounting bracket, with a bolt, nut and washer (Ref. 20-27-11). Torque load the nut to 30-40 lbf in (0.34 - 0.45 mdaN).

(8) Check that the electrical plug and receptacle are clean and undamaged and connect the plug to the fan receptacle.

(9) Remove the safety clips and reset the circuit breakers previously tripped.

(10) Reconnect electrical ground power and operationally test the fan as detailed in 21-21-53, Adjustment/Test.

(11) Refit the floor panel.

NON-RETURN VALVE (REAR BAGGAGE COMPARTMENT) - REMOVAL/INSTALLATION

1. General

A non-return valve (NRV), located in the roof of the rear baggage compartment, is housed in the aperture of an outward relief duct, which connects the baggage compartment with its underfloor area. Access to the valve is by removal of the surrounding furnishing roof panel.

2. Non-Return Valve (Ref. Fig. 401)

A. Prepare to Remove NRV

(1) Remove the four screws securing the duct flange, NRV and grill assembly, to the rear baggage compartment roof panel 243-MS.

(2) Remove the roof panel attachment screws. Remove the roof panel.

B. Removal

(1) Remove the screws securing the grill to the duct flange, support the NRV, remove the grill and the O-ring seal. Remove the NRV.

(2) If a NRV is not to be fitted immediately, fit a blank cover over the duct aperture.

C. Installation

(1) Remove the blank cover from the duct aperture, and ensure that the duct is clean and unobstructed.

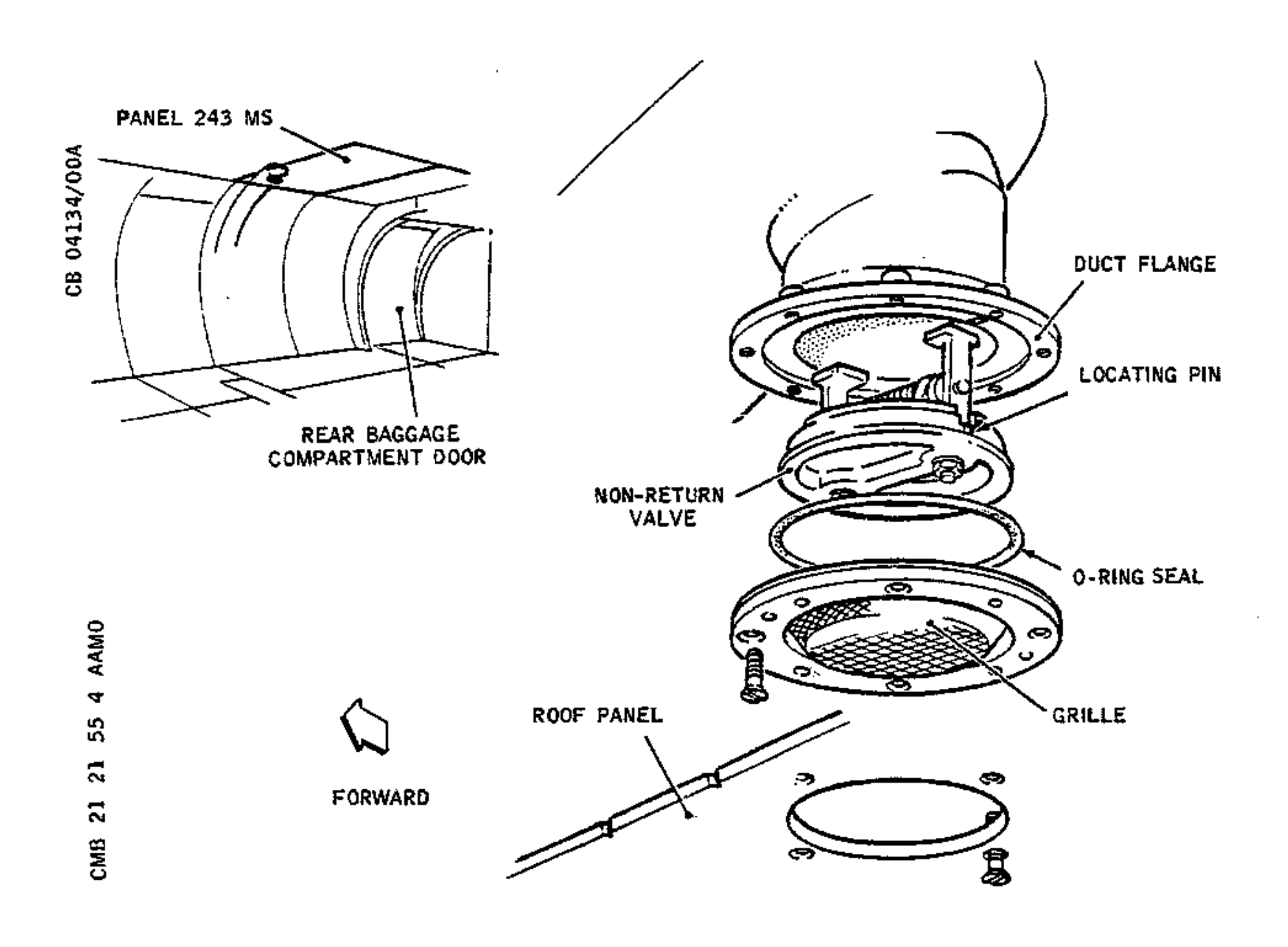
(2) Check that the NRV is undamaged and that the flaps of the valve will open freely and, when released, return to the closed position.

(3) Locate the NRV in the duct aperture, by aligning the valve locating pin with the slot in the duct flange. Insert the NRV in the aperture.

(4) Fit a new O-ring seal in the groove formed by the outer ring of the NRV, and the duct flange.

(5) Support the NRV, fit the grill over the NRV and secure it with four attachment screws.

(6) Place the roof panel into position and secure it to its attachment structure. Secure the duct flange to



- Non-Return Valve - (Rear Baggage Compartment Outward Relief)

R Figure 401

the roof panel with four attachment screws.

NON-RETURN VALVE (REAR BAGGAGE COMPARTMENT) - ADJUSTMENT/TEST

1. General

The non-return valve is located in the roof of the rear baggage compartment on an outward relief duct connecting the compartment with its under floor space. The valve comprises two spring-loaded flaps which are fitted in a fore-and-aft configuration.

2. Operational Test

R (1) Insert a suitable probe through the wire guard
protecting the non-return valve and check the valve
R flaps for !freedom of movement. Open each flap fully
R and check that, when slowly released, the flaps
R return to the closed position without sticking or
R binding.

Printed in England

MASS FLOW AMPLIFIER - REMOVAL/INSTALLATION

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED IN 24-00-00.

1. General

The mass flow amplifier is housed in a single Elfin case, mounted on shelf 9-216, in the flight compartment RH equipment racking at the third crew member's (3CM) station.

2. Mass Flow Amplifier

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit breaker clip	-

B. Prepare

(1) Electrically isolate the amplifier by tripping circuit breaker D201 on panel 1-213, map ref. G11. Fit safety clip.

(2) Remove the appropriate cover from the RH racking and identify the amplifier to be removed.

C. Remove

(1) Loosen the two captive securing screws.

(2) Grasp the carrying handle and carefully withdraw the amplifier from the backplate connector. Remove the amplifier from the shelf.

RB (3) Examine rack and unit connectors for:

RB (a) Bent, damaged or corroded contact pins.

RB (b) Distorted, displaced or blackened socket
RB contacts.

RB (c) Pierced, or otherwise damaged dielectric.

RB (d) Connector body free from damaged polarising
RB posts and keyways.

RB NOTE: If connector is damaged refer to WDM 20-42-71.

D. Install

(1) Comply with the electrical safety precautions.

RB (2) Examine unit connector for:

RB (a) Bent, damaged or corroded contact pins.

RB (b) Distorted, displaced or blackened socket
RB contacts.

RB (c) Pierced, or otherwise damaged dielectric.

RB (d) Connector body free from damaged polarising
RB posts and keyways.

RB NOTE: If connector is damaged refer to WDM 20-42-71.

(3) Slide the amplifier into the shelf and carefully engage the electrical connector.

(4) Complete the installation by tightening the securing screws. Ensure that the amplifier is electrically bonded in accordance with 20-27-11.

E. Conclusion

(1) Refit and secure the cover.

(2) Remove the safety clip and reset the circuit breaker tripped before removal.

**ON A/C 001-006,
B (3) Carry out Operation Test - Main Fans (Ref. 21-21-19,
B Adjustment/Test).

**ON A/C 007-007,
(3) Perform an Operational Test of the Forward Extraction System (Ref. 21-21-19, Adjustment/Test).

TOILET VENTILATION

R B 1. Cleaning

R B Toilet ventilation air extraction pipes should be cleaned as
R B follows.

R B A. Remove grille from wall fitting above toilet seat. Clean
R B grille and recess behind it.

R B B. Remove dirt from inside wall duct with fine brush and air
R B line passed down the duct.

R B C. Refit grille.

R B 2. Test

R B A clean system should be able to hold a piece of toilet paper,
R B placed over the grille, by suction with the forward extraction
R B fans running.

END OF THIS SECTION

NEXT

BATTERY VENTING SYSTEM - DESCRIPTION AND OPERATION

1. General (Ref. Fig. 001)

The batteries are vented to atmosphere through two inter-connected pipes. Both pipes incorporate relief valves and drain valves, and terminate in overboard vents.

The vent pipes of the system are connected to each of the two batteries, which are located in the left and right hand forward electrical racks in the flight compartment. The pipes then pass underfloor where they are routed aft to connect with two overboard vents on the underside of the fuselage immediately forward of the nose wheel bay.

When fitted, the flight test instrumentation batteries are vented in a similar manner to the main batteries. The system is connected to the main battery venting system near the left hand overboard vent.

2. Relief Valves

Two of these valves are installed in the battery venting system to relieve pressure in excess of 1.5 psi (0.102 bars). Each valve consists of a spring-loaded pad housed in a PTFE body and cover. The body of the valve has two in-line inlet pipes, and the cover incorporates the drain outlet. Only one inlet is used, the other being fitted with a blank plug.

The valve stem protrudes through the cover to provide a manual test facility for the valve, and to allow manual operation of the valve to drain accumulated moisture into the drain valve.

The valve is normally held closed by a spring which holds the viton insert in the valve pad against its seating.

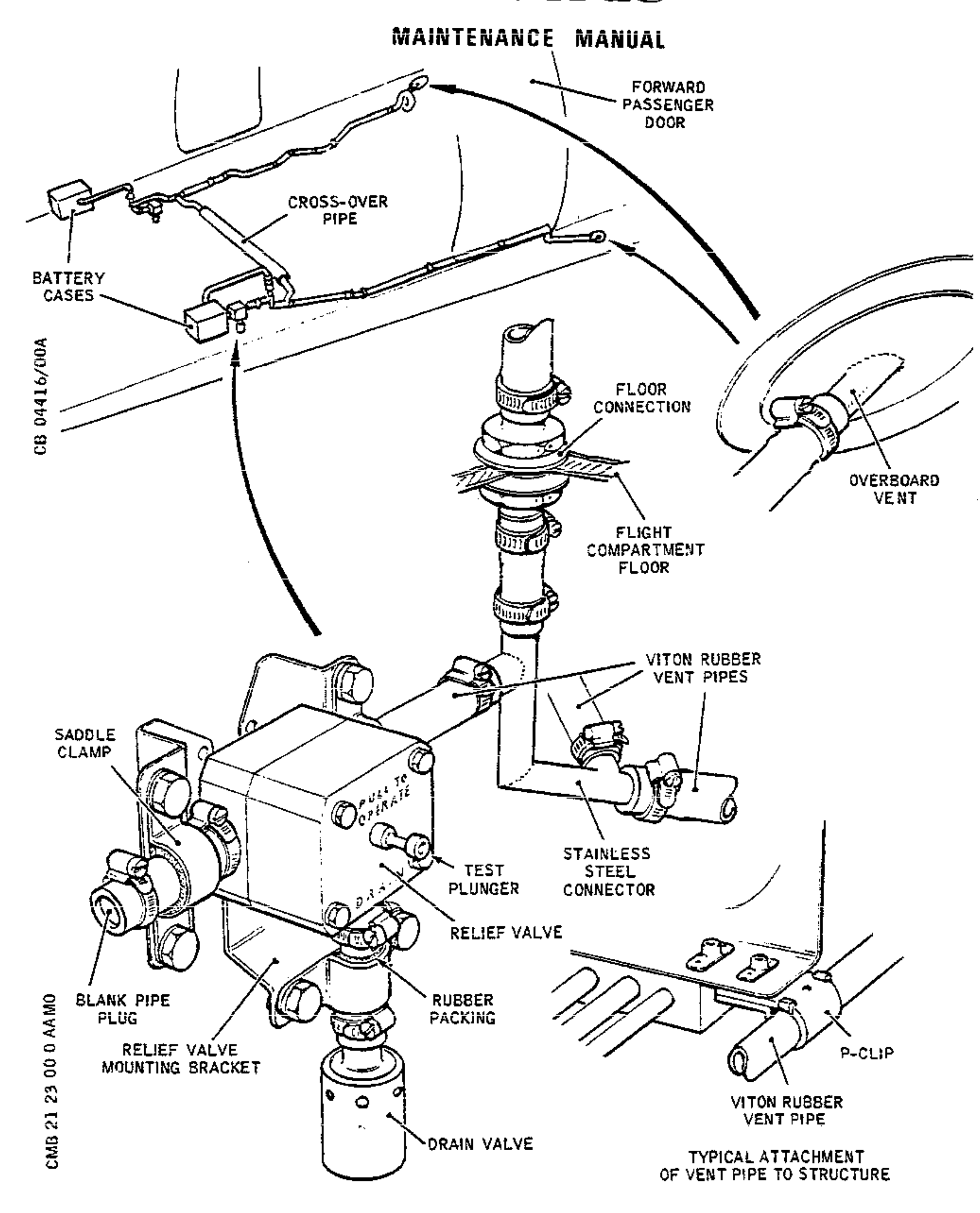
3. Drain Valves

These valves are attached to the drain outlets of the relief valves, and allow the fumes and excess pressure released by the relief valve to escape into the underfloor area. Each valve, which consists of a drain tube welded into a receptacle, has no working parts and is made of stainless steel. The receptacle retains any fluid released by the relief valve, and has six vent holes near the top.

4. Vent Pipes and Connectors

The pipes for the system are manufactured from viton rubber and are routed mainly below the floor. Stainless steel

Printed in England



R

Battery Venting
Figure 001

connectors are utilized at the joints, which are attached to the viton rubber pipes with worm drive clips. Worm drive clips are also used to connect the pipe system to the overboard vents and the battery case union connectors. The pipe system is secured to the aircraft structure at regular intervals with P clips.

5. Operation

The fumes given off by the batteries, aided by differential pressure, are ducted overboard directly from the battery casings through the pipes of the battery vent system to the overboard vents. Should either of the overboard vents become blocked the cross over pipe allows the system to vent through the other overboard vent. In the event of both overboard vents being blocked, the relief valve will open at 1.5 psi (0.102 bars) and allow the system to vent into
R the underfloor area. Fluid in the system is then
R released into the drain pot on the relief valve.

BATTERY VENTING SYSTEM - TROUBLE SHOOTING

1. General

Faults are dealt with on a probability basis and identified as a result of testing.

The defect can be isolated with the aid of the trouble shooting procedures (Ref. para.2), and traced through OK and NOT OK paths to the specified rectification action. If a defect occurs, perform the appropriate rectification action, then repeat the operation at which the defect was encountered, to ensure that the operation is OK.

Bracketed numbers in the procedures indicate items on the component identification table (Ref. Table 101). The table provides information, including component location, required for rectification.

R 2. Trouble Shooting

```
R    ************************************************
R  A.*If odour of battery gases is detected, check *
R    *overboard vents for blockage.                 *
R    ************************************************
R          ||          |
R          ||          |         --------------------------------------
R          OK          --NOT OK--|Clear blockage (Ref.21-23-00,       |
R          ||                    |Adjustment/Test).                   |
R          ||                    --------------------------------------
R          ||
R    ************************************************
R  B.*Operate test plunger on relief valve (1) -    *
R    *Check valve operates correctly (Ref.21-23-11,*
R    *Adjustment/Test).                             *
R    ************************************************
R          ||          |
R          ||          |         --------------------------------------
R          OK          --NOT OK--|Renew relief valve (1),(Ref.21-23- |
R          ||                    |11, Ewmoval/Installation).          |
R          ||                    --------------------------------------
R          ||
R    ************************************************
R  C.*Check drain valve (2) receptacles below the   *
R    *valves (1) for fluid).                        *
R    ************************************************
R          ||          |
R          ||          |         --------------------------------------
R          OK          --NOT OK--|Remove fluid from receptacles.      |
R          ||                    --------------------------------------
R          ||
```

```
R     ***********************************************
R   D.*Check battery venting non-return valve (3)   *
R     *for correct operation (Ref.24-31-11, Inspect-*
R     *ion/check).                                  *
R     ***********************************************
R           ||           |
R           ||           |          ------------------------------------
R           OK           --NOT OK--|Renew non-return valves (3).       |
R           ||                      ------------------------------------
R           ||
R     ***********************************************
R   E.*Check pipes and ducts for blockage or damage.*
R     *Rectify as necessary (Ref.21-23-00,Adjust-   *
R     *ment/Test).                                  *
R     ***********************************************
```

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
(1) Relief valve	123AB	123	-	Forward equipment bay	21-23-00	-
(2) Drain valve	123AB	123	-		21-23-00	-
(3) Non-return valve (battery)	123AB 125AS 126AS	123	-	In battery covers	24-31-11	-

Component Identification
Table 101

BATTERY VENTING SYSTEM - ADJUSTMENT/TEST

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS IN 24-00-00.

R **ON A/C 007-007,

1. General (Ref. Fig. 501)

R **ON A/C 001-006,

1. General (Ref. Fig. 502)

The system is located mainly below the floor in the forward equipment bay and partly above the floor in the flight compartment electronic racks. Access to the underfloor part of the system is through an access door in the underside of the forward fuselage, beneath the flight compartment, and access to the above floor part of the system is by removal of the battery compartment panels in the flight compartment. Operational tests for system components, a functional test for the relief valves and a system leakage/blockage test are given.

R **ON A/C 007-007,

2. Operational Test (Ref. Fig. 501)

R **ON A/C 001-006,

2. Operational Test (Ref. Fig. 502)

A. Prepare to Test

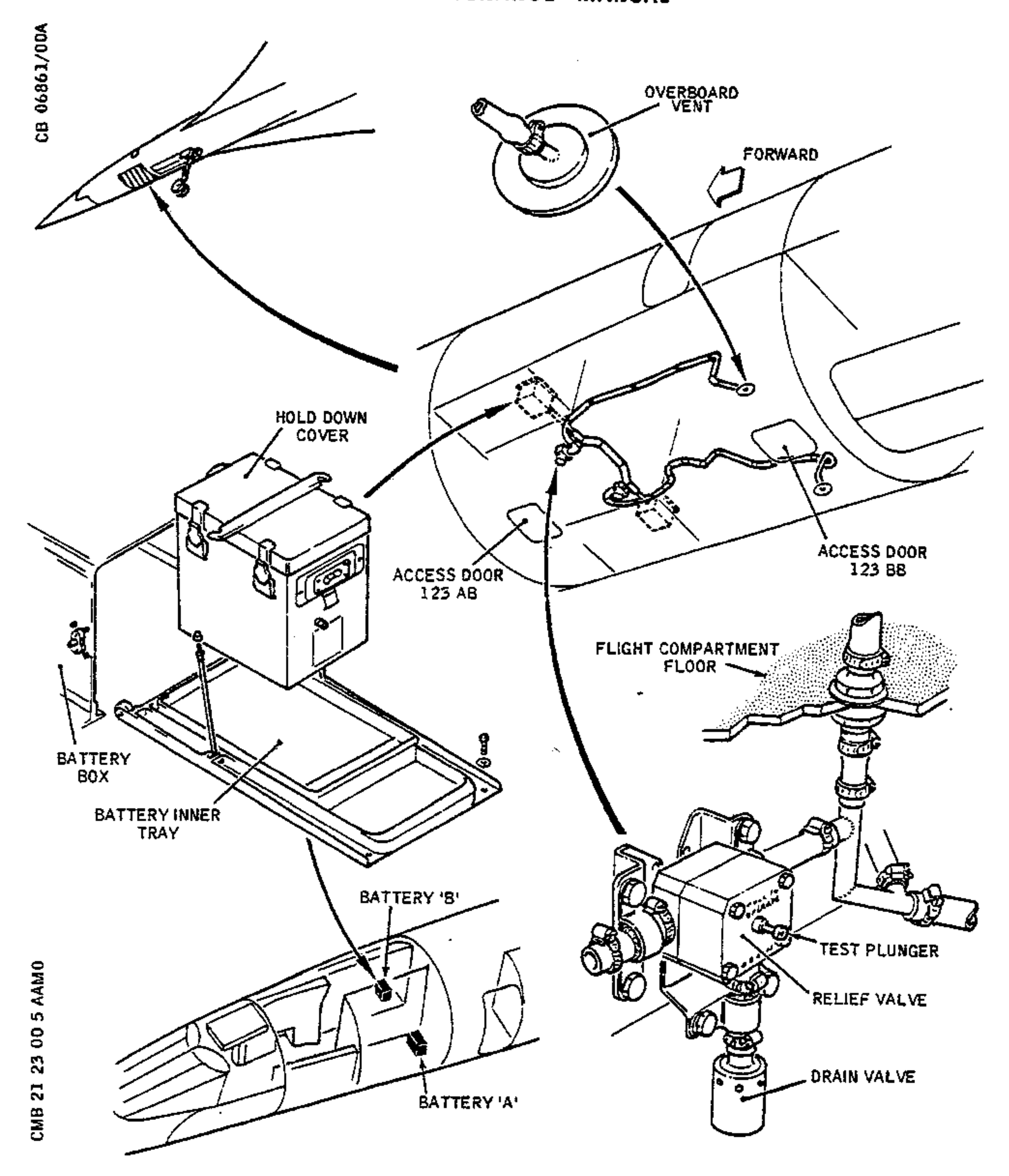
(1) Open access door 123 AB by pushing button and pulling handle down to gain access to the two relief valves and two drain valves.

NOTE: The door hinges inwards and is secured in the open position by a latch.

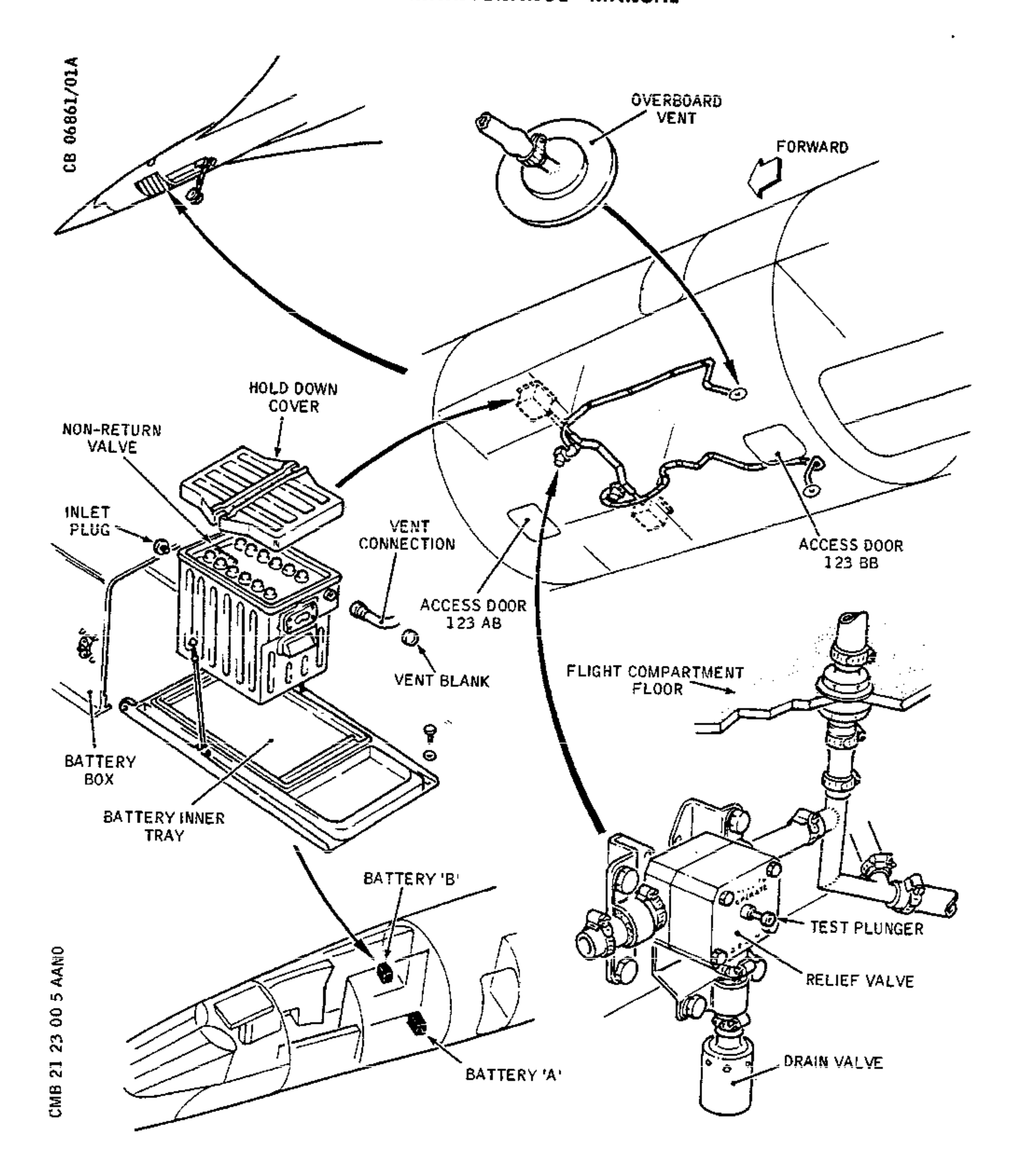
(2) Ensure that there is no fluid in the drain valve receptacles and that the drain valve vent holes are free from obstruction.

(3) In the flight compartment, remove the battery compartment panels 215 AS and 216 AS.

(4) Withdraw the battery tray (Ref. 24-31-11, Removal/Installation).



Battery Venting System - Testing
Figure 501



Battery Venting System - Testing
Figure 502

(5) Remove the battery hold-down cover (do not remove the battery from the tray), to gain access to the non-return valves in the battery vent connections.

B. Test

(1) On the relief valves, pull out the test plunger to withdraw the valve stem and open the valve. Ensure that the stem moves without binding (spring resistance approximately 0.2 lb (0.1 kg).

(2) Release the test plunger and ensure that the valve returns to its seat under spring load.

(3) In the battery compartment, check manually that both non-return valves open and close.

C. Conclusion

(1) In the flight compartment, fit the hold-down cover on the battery.

(2) Install the battery tray (Ref. 24-31-11, Removal/Installation).

(3) Refit the battery compartment panels 215 AS and 216 AS.

(4) Release the latch and close access door 123 AB, by operating the handle; ensure that the door seal is not damaged before closing the door and ensure that the handle is correctly stowed (Ref. 52-41-11).

R **ON A/C 007-007,

3. Functional Test (Ref. Fig. 501)

R **ON A/C 001-006,

3. Functional Test (Ref. Fig. 502)

A. Equipment and Materials

DESCRIPTION	PART NO.
Air pressure supply rig, to supply air up to 5 psi (0.34b)	TE 620

DESCRIPTION	PART NO.
Wire, non-corridible, steel 0.028 in (0.7 mm) dia.)	-

B. Prepare to Test

(1) Open access door 123 AB, by pushing the button and pulling the handle down.

NOTE: The door hinges inwards and is secured in the open position by a latch.

(2) Remove the locking wire and slacken the worm drive clip, then disconnect the vent pipe from the valve.

(3) Connect the air supply rig to the valve inlet.

C. Test

(1) Slowly increase the air pressure and check that the valve starts to open when the pressure is between 1.5 and 1.75 psi (0.1 and 0.12 b).

(2) Release the air pressure and ensure that the valve seats correctly.

D. Conclusion

(1) Disconnect the air pressure supply rig from the valve.

(2) Attach the vent pipe to the valve with the worm drive clip. Lock the clip with wire.

(3) Release the latch and close access door 123 AB, by operating the handle; ensure that the door seal is not damaged before closing the door, and ensure that the handle is correctly stowed (Ref. 52-41-11).

R **ON A/C 007-007,

4. System Test Leakage/Blockage (Ref. Fig. 501)

R **ON A/C 001-006,

4. System Test (Leakage/Blockage) (Ref. Fig. 502)

R **ON A/C 001-006,

A. Equipment and Materials

	DESCRIPTION	PART NO.
B B B	Air Pressure rig and adaptor	Bryan Model 1858 Adaptor Pt. No. E925054000
	Suitable blanks for overboard vents and vent pipe connections at battery.	-

R **ON A/C 007-007,

A. Equipment and Materials

DESCRIPTION	PART NO
Air pressure rig, to supply air up to 5 psig (0.35b) and capable of creating suction of 11 psig (0.76b).	TE 620 (Normalair Garrett)
Flowmeter, to measure flow up to 2 cfm.	-
Suitable blanks for overboard vents and vent pipe connections at battery.	-

B. Prepare to Test

(1) In the flight compartment, remove the battery compartment panels 215 AS and 216 AS.

(2) Withdraw the battery tray (Ref. 24-31-11, Removal/Installation).

(3) Remove the battery hold-down cover (do not remove the battery from the tray), to gain

access to the battery venting connections.

(4) Open access door 123 AB, in the underside of the forward fuselage, by pushing the button and pulling the handle down, to gain access to the relief valves and drain valves.

NOTE: The door hinges inwards and is secured in the open position by a latch.

(5) Ensure that there is no fluid in the drain valve receptacles and that the drain valve vent holes are free from obstruction.

C. Test

(1) Connect the air supply rig to one vent outlet using adaptor.

(2) Disconnect vent pipes from LH & RH batteries, apply air pressure from rig and check that there is a free flow from:

(a) Opposite side static vent.

(b) LH battery vent pipe.

(c) RH battery vent pipe.

NOTE: To confirm a free flow from any one of the three outlets it may be necessary to blank the other two outlets.

(3) Disconnect vent pipes from LH & RH vent relief valves in the under floor compartment and blank each vent line. Blank the LH & RH battery vent pipes and static vent using speedtape.

(4) Apply 10 psi air pressure to vent system and check that pressure does not fall below 9 psi in one minute.

(5) Apply 22 in Hg vacuum and check that vacuum does not fall below 18 in Hg in three minutes.

(6) Remove blank from LH relief valve and reconnect valve to vent pipe. Apply pitot pressure and check that pressure cannot be raised above 1.5 psi (260 Kts). Refit blank to LH relief valve vent pipe.

RB NOTE: Slight air leakage (up to 0.025 cfm), from the valve
RB drain is permissible before the relief valve cracks at
RB 1.5 psi. It is important to check that the relief
RB valve operates.

B (7) Repeat paragraph (6) for RH relief valve.

B (8) Remove all blanks and restore all vent connections to
B normal.

B D. Conclusion

(1) Release the latch and close access door 123 AB, by operating the handle; ensure that the door seal is not damaged before closing the door, and ensure that the handle is correctly stowed (Ref. 52-41-11).

(2) In the battery compartment, remove the blank from the right-hand vent pipe and reconnect the pipe.

(3) Fit the hold-down cover on the battery.

(4) Install the battery tray (Ref. 24-31-11, Removal/Installation).

(5) Refit the battery compartment panels 215 AS and 216 AS.

BATTERY VENTING SYSTEM - INSPECTION/CHECK

1. General

The system is located mainly below the floor in the forward equipment bay, and partly above the floor in the flight compartment electronic racks. Access to the underfloor part of the system is obtained by removal of the central access panels, and the above floor part by removal of the battery compartment panels of the electronic racks. Checks of the battery case and the non-return valves are in 24-31-11.

R 2. Battery Venting System

A. Equipment and Materials

DESCRIPTION	PART NO.
Extension lamp (explosion proof)	-

B. Prepare to Inspect

(1) Remove access panels 123AB and 123BB, and the battery compartment access panels of the electronic racks.

C. Inspect

(1) Visually inspect all the components of the system for cleanliness and freedom from damage. Check the components for security of attachment and that all locking devices are effective.

(2) Visually inspect the pipe joints on the stainless steel connectors and ensure that there is no evidence of battery fluid leakage.

(3) Visually inspect the relief valve and ensure that one inlet to the valve is blanked.

(4) Check that the drain valve receptacles are empty and that the vent holes are clear.

(5) Check that the overboard vent apertures in the aircraft skin are clear.

(6) Check the system connections to each battery case, and ensure that there is no evidence of leakage from the battery.

R 3. Battery Drain valves

R (1) Remove the drain valve receptacles and empty if necessary.
R Check that the receptacle vent holes are clean and clear.

R (2) Refit the receptacle.

R (3) Refit the access panels.

RELIEF VALVE - REMOVAL/INSTALLATION

1. General

Two relief valves, which relieve excess pressure in the battery venting system, are attached by saddle clamps to mounting brackets beneath the flight compartment floor. The left and right hand installations are similar, and access to the valves is through an access door in the underside of the forward fuselage, beneath the flight compartment.

2. Relief Valve (Ref. Fig. 401)

A. Equipment and Materials

	DESCRIPTION	PART NO.
R R	Torque spanner (0 - 50 lbf in 0 - 0.565 mdaN range)	-
R R	Wire, non-corrodible (0.028 in, 0.7 mm dia)	-
R R	Lamp - explosion proof	-

B. Prepare to Remove

(1) Open acces door 123 AB by pushing button and pulling handle down.

NOTE: The door hinges inwards and is secured in the open position by a latch.

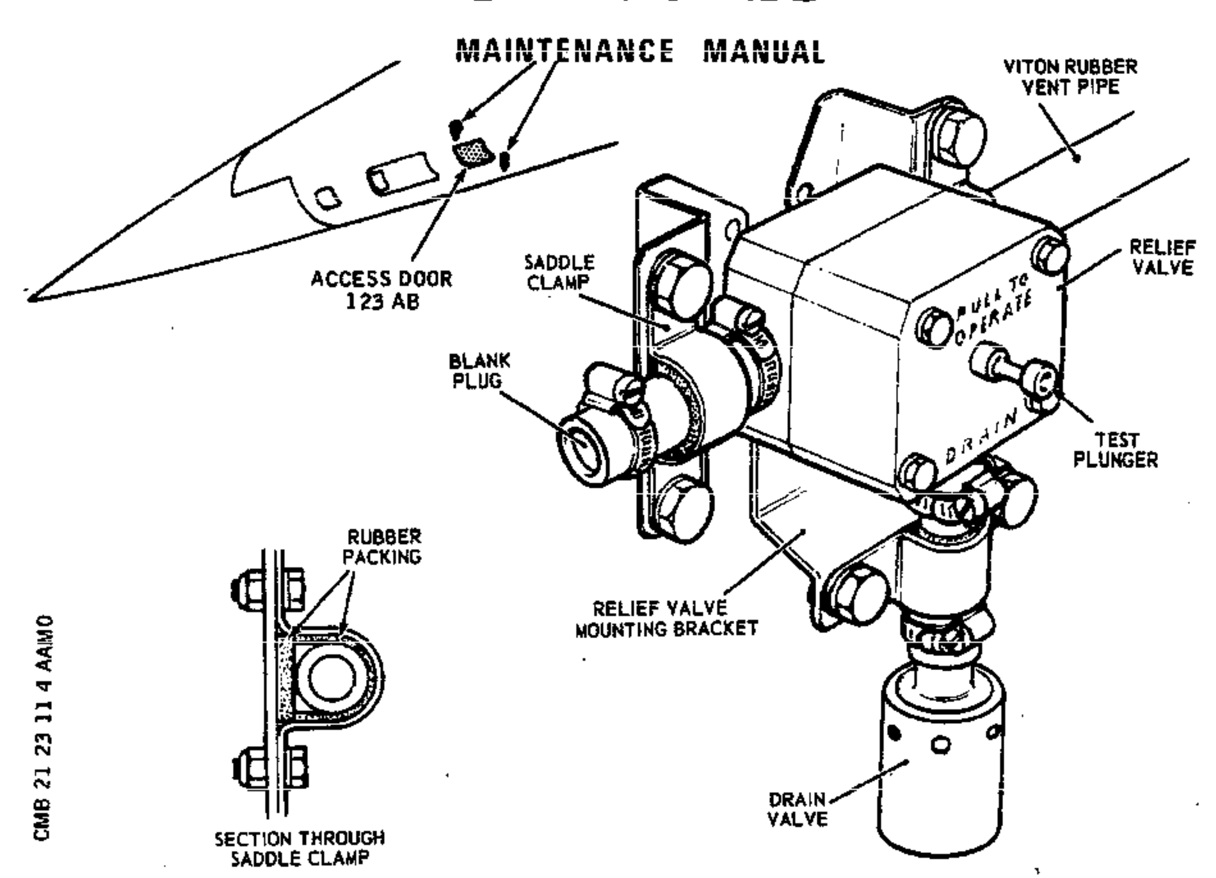
C. Remove

(1) Slacken the worm drive clip securing the vent pipe to the relief valve.

(2) Support the relief valve and drain valve assembly, and remove the three saddle clamps.

(3) Remove the relief valve complete with blank pipe, plug and drain valve.

(4) Remove the blank pipe and plug, and the drain valve from the relief valve and fit suitable



Relief Valve - Installation
Figure 401

blanks to the pipe connections of the valve.

(5) If a replacement valve is not to be fitted immediately, fit a suitable blank to the open end of the system vent pipe.

D. Install

(1) Remove the blank covers from the pipe connections on the relief valve, and operate the test plunger to check that the valve stem moves without binding, and the spring resistance (0.2 lb approx) can be felt.

(2) Inspect the rubber packing in the saddle clamps and on the mounting brackets; if damaged, refit new packings. Bond a new packing to the clamp and bracket with adhesive in accordance with
R 20-25-15.

(3) Attach the blank pipe plug and drain valve to the relief valve with worm drive clips. Lock the

clips with wire.

(4) Remove the blank cover from the system vent pipe and attach the relief valve assembly to the vent pipe with a worm drive clip. Lock the clip with wire.

(5) Position the valve and secure to the mounting brackets with the saddle clamps, washers and bolts. Wet assemble the bolts and washers in accordance with 20-22-14. Torque load each bolt to between 40 and 45 lbf in (0.452 and 0.508 mdaN), and lock with wire.

R (6) Operationally test the valve, (Ref.21-23-11,
R Adjustment/Test).

(7) Release the latch and close access door 123 AB, by operating the handle, ensure that the seal is not damaged before closing the door and ensuring that the handle is correctly stowed. (Ref. 52-41-11).

RELIEF VALVE - ADJUSTMENT/TEST

1. General

These procedures cover the operational and functional testing of the two relief valves which relieve excess pressure in the battery venting system. The valves are spring-loaded to the closed position and normally open automatically when the system pressure exceeds a predetermined value, but provision is made for manual operation of the valve by means of the valve stem which protrudes through the cover. Access to the valves is through an access door in the underside of the forward fuselage, beneath the flight compartment.

2. Operational Test (Ref. Fig. 501)

A. Prepare to Test

(1) Open access door 123 AB, by pushing the button and pulling the handle down.

NOTE: The door hinges inwards and is secured in the open position by a latch.

B. Test

(1) Pull out the test plunger to withdraw the valve stem and open the valve. Ensure that the stem moves without binding and that spring resistance of approximately 0.2 lb (0.1 kg) is felt.

(2) Release the test plunger and ensure that the valve returns to its seat under spring load.

C. Conclusion

(1) Release the latch and close access door 123 AB, by operating the handle; ensure that the door seal is not damaged before closing the door and ensure that the handle is correctly stowed (Ref.52-41-11).

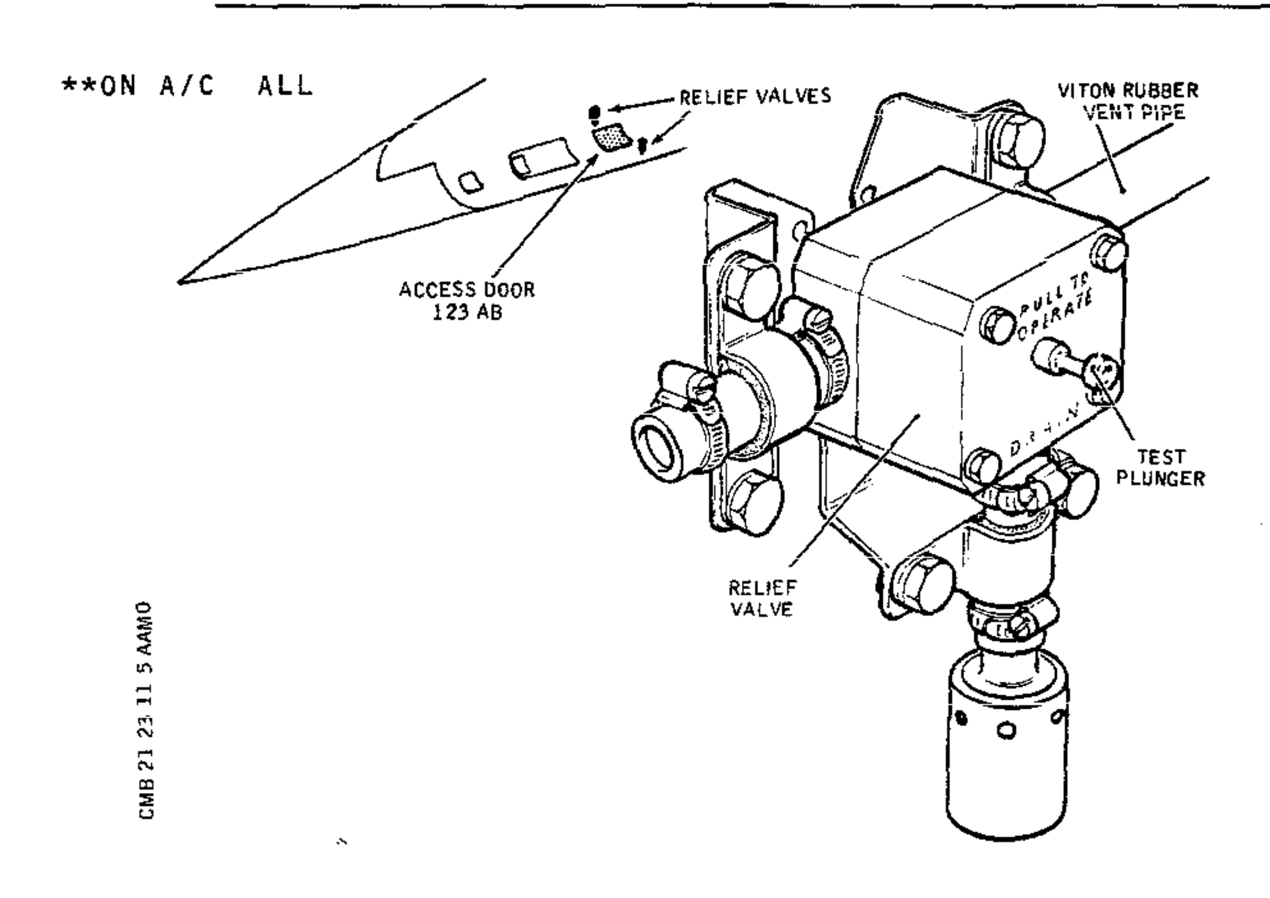
3. Functional Test (Ref. Fig. 501)

A. Equipment and Materials

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DESCRIPTION	PART NO.

**ON A/C ALL



Relief Valve - Testing
Figure 501

DESCRIPTION	PART NO.
Air pressure supply rig, to supply air up to 5 psi (0.34b)	TE 620 (Normalair-Garrett)
Wire, non corrodible steel (0.028 in (0.7 mm) dia))	-

B. Prepare to Test

(1) Open access door 123 AB, by pushing the button and pulling the handle down.

NOTE: The door hinges inwards and is secured in the open position by a latch.

(2) Remove the locking wire and slacken the worm drive clip then disconnect the vent pipe from the valve.

(3) Connect the air supply rig to the valve inlet.

C. Test

(1) Slowly increase the air pressure and check that the valve starts to open when the pressure is between 1.5 and 1.75 psi (0.1 and 0.12 b).

(2) Release the air pressure and ensure that the valve seats correctly.

D. Conclusion

(1) Disconnect the air pressure supply rig from the valve.

(2) Attach the vent pipe to the valve with the worm drive clip. Lock the clip with wire.

(3) Release the latch and close access door 123 AB, by operating the handle; ensure that the door seal is not damaged before closing the door and ensure that the handle is correctly stowed (Ref.52-41-11).

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FRESH AIR DISTRIBUTION - DESCRIPTION AND OPERATION

1. General (Ref. Fig. 001 and 002)

The system ducts conditioned air, from each of the four engines (Ref. 21-00-00) or a ground air supply, to the flight compartment, pasenger compartments, vestibules, toilets and baggage compartments. Its operation is controlled by the air generation system (Ref. 21-10-00, 21-11-00 and 21-12-00) and the air extraction system (Ref. 21-21-00).

Air from the generation system passes, via non-return valves, into a distribution manifold. This manifold normally directs the air supplies in such a way as to preserve the independence of controlled air temperatures for the three outlets supplying the main temperature controlled zones, which are the flight compartment and the forward and rear passenger compartments. The temperature of these three zones is normally controlled by air generation systems No. 1, 2, 3 and 4 respectively. However, in the event of failure of one or more of the air generation systems, the manifold supplies the three zones from the available air supplies.

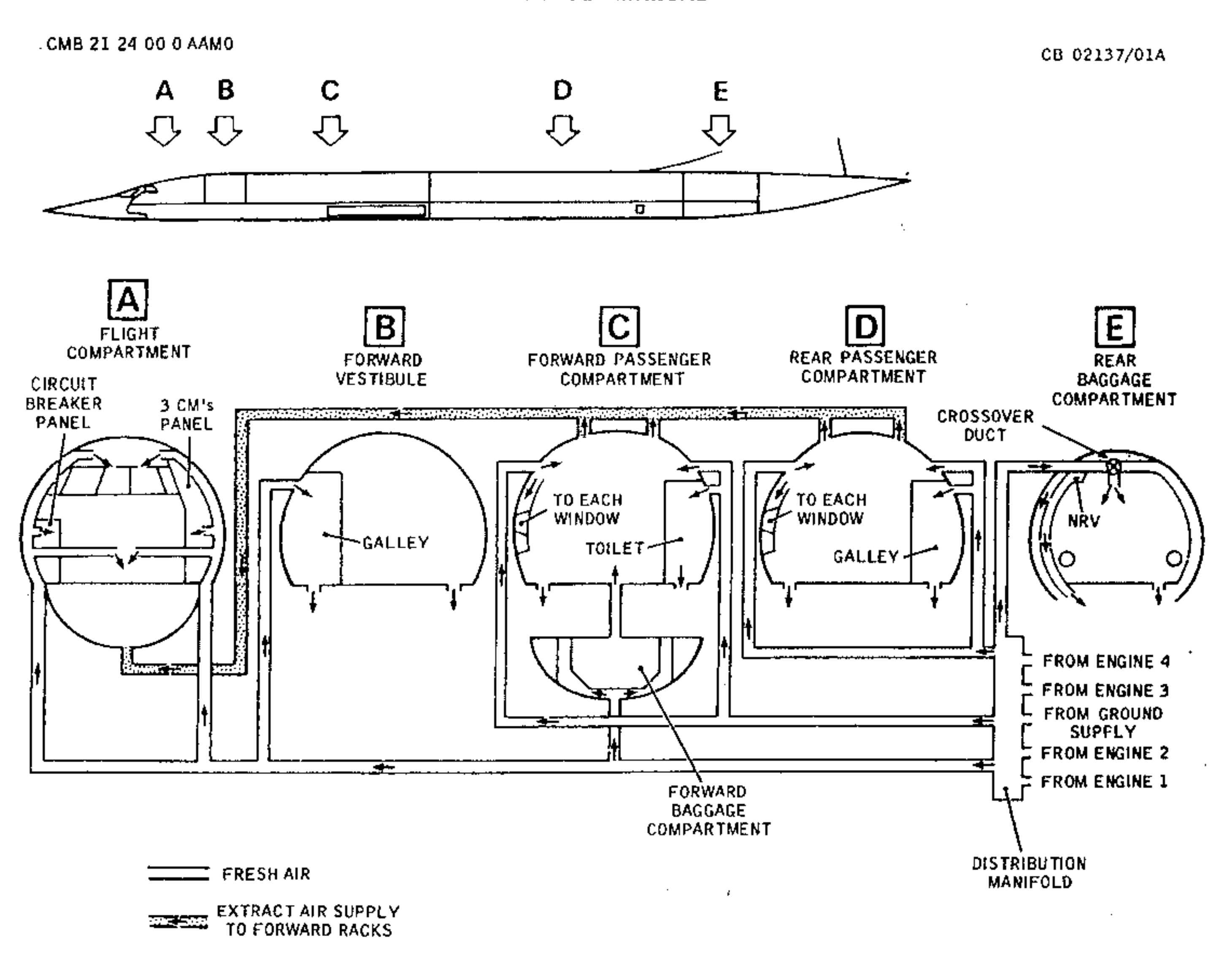
The fresh air supply is directed round the forward and rear baggage compartments, to the forward, centre and rear vestibules, flight compartment windows and pilots' air louvres and outlet stubs, the third crew member's panels, circuit breaker panels and the passenger compartment windows. Both underfloor electronic racks are cooled by cabin extract air. The above-floor electronic racks receive cooling air from the fresh air supply ducts and some through grilles in their enclosure panels. There is also a fresh air supply to the toilet compartments. Fresh air is supplied to the passengers by individual air louvres in the overhead amenity panels. Fresh air bleeds are used to ventilate the flight/crew oxygen bottle stowage, the passenger oxygen bottle stowage, the crew/passenger oxygen interconnection in the forward vestibule and the passenger oxygen control panel in the rear vestibule. There is an additional fresh air bleed from the rear of the forward baggage compartment to the radio altimeter transceivers (Ref. 25-52-00 and 34-42-41).

2. Air Louvres (Ref. Fig. 003)

There are four air louvres in the flight compartment fresh air supply overhead ducting. They are installed to give each crew member an independent, manually controlled, supply of fresh air.

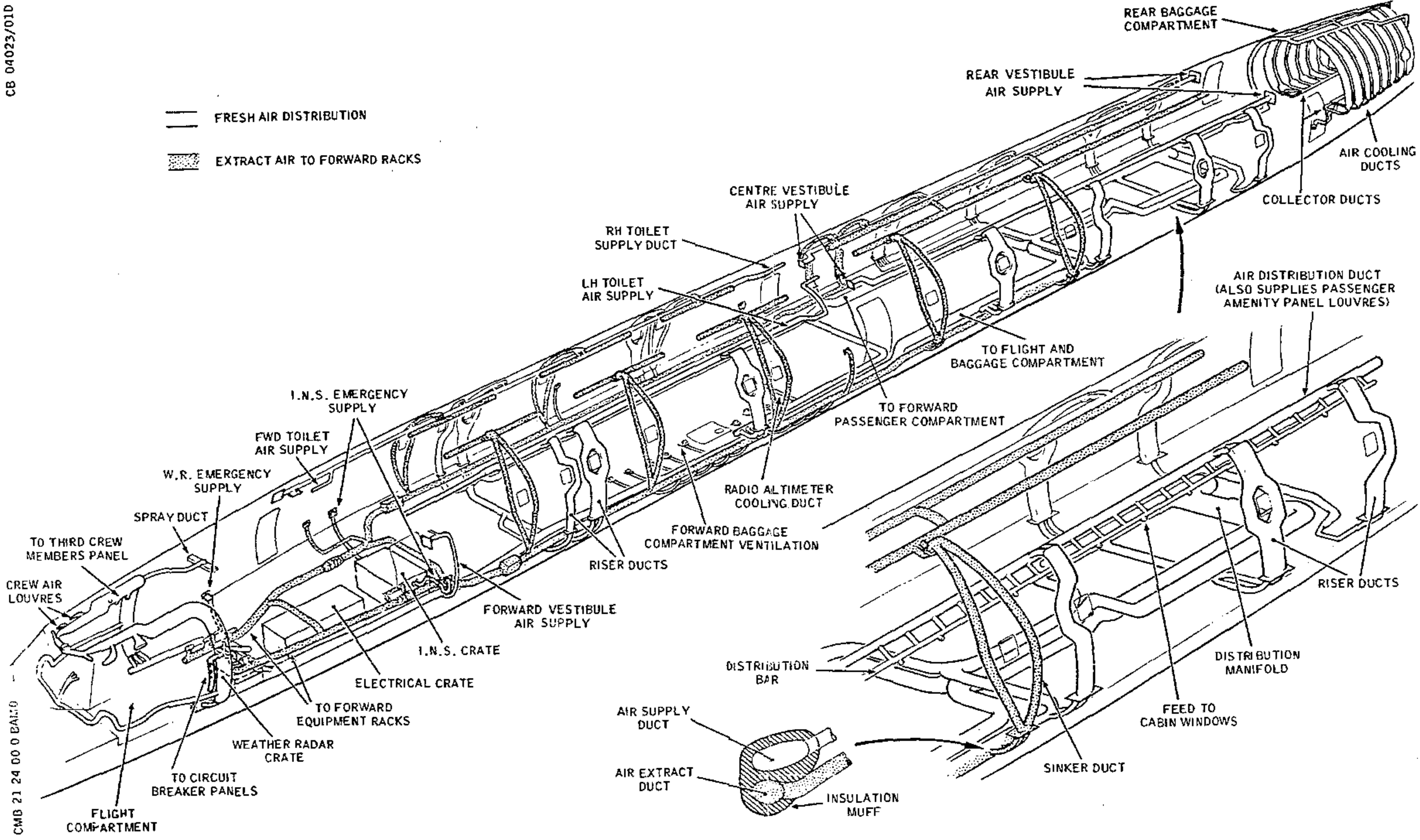
Each air louvre comprises a plastic hollow ball located

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R

Fresh Air Distribution - Schematic
Figure 001

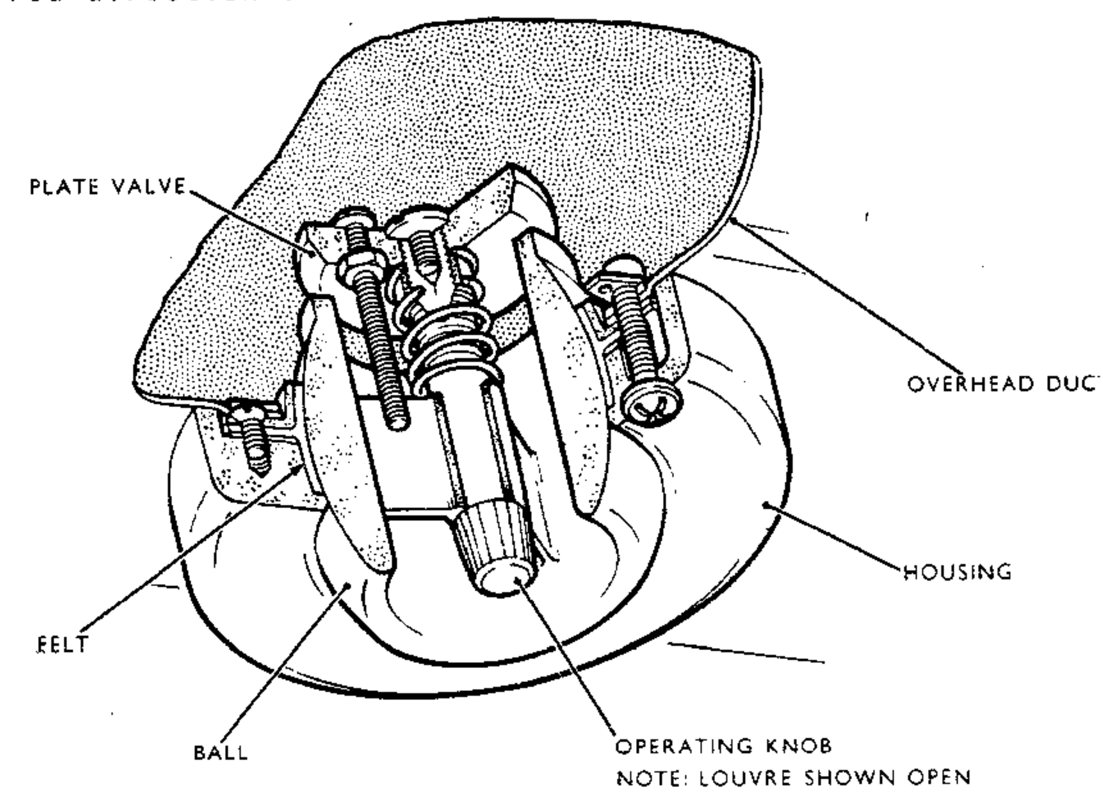


R

Fresh Air Distribution
Figure 002

in a part spherical housing. A knurled operating knob in the centre of the ball controls a spring-loaded plate valve which regulates the airflow.

To operate the louvre, turn the knurled knob fully clockwise; this action completely shuts off the airflow from the louvre. Turn the knob counter-clockwise to open the louvre and regulate the amount of efflux required. Rotate the ball universally in its housing to obtain the required direction of efflux.



R Air Louvre
Figure 003

3. <u>Non-return Valve</u> (Ref. Fig. 004)

In the event of a sudden de-compression of the pressurised fuselage, a non-return valve (NRV) in the rear baggage compartment roof, relieves excess pressure in the compartment into the underfloor area. The NRV, which comprises an intake ring and grille with a bracket at the top and bottom, houses a spindle to which is hinged a pair of semi-circular flaps held closed against the intake ring by a spring. With a differential pressure of 1.25 in W.G. between the rear

baggage compartment and the underfloor area, the NRV opens to allow excess pressure in the compartment into the underfloor area.

4. Ducting (Ref. Fig. 005)

The distribution manifold and the main underfloor air supply ducts are made of light alloy, whilst the underfloor passenger compartment air extraction ducts are made of rigid glass cloth. The remainder of the ducting and manifolds, with the exception of the distribution bar, are made of flexible resin bonded glass tape or glass cloth laminations in convenient lengths for installation or handling. Beads are formed on the ends of ducts by wrapping the outer lamination of glass tape over a fibre glass string. The distribution bar is of plastic.

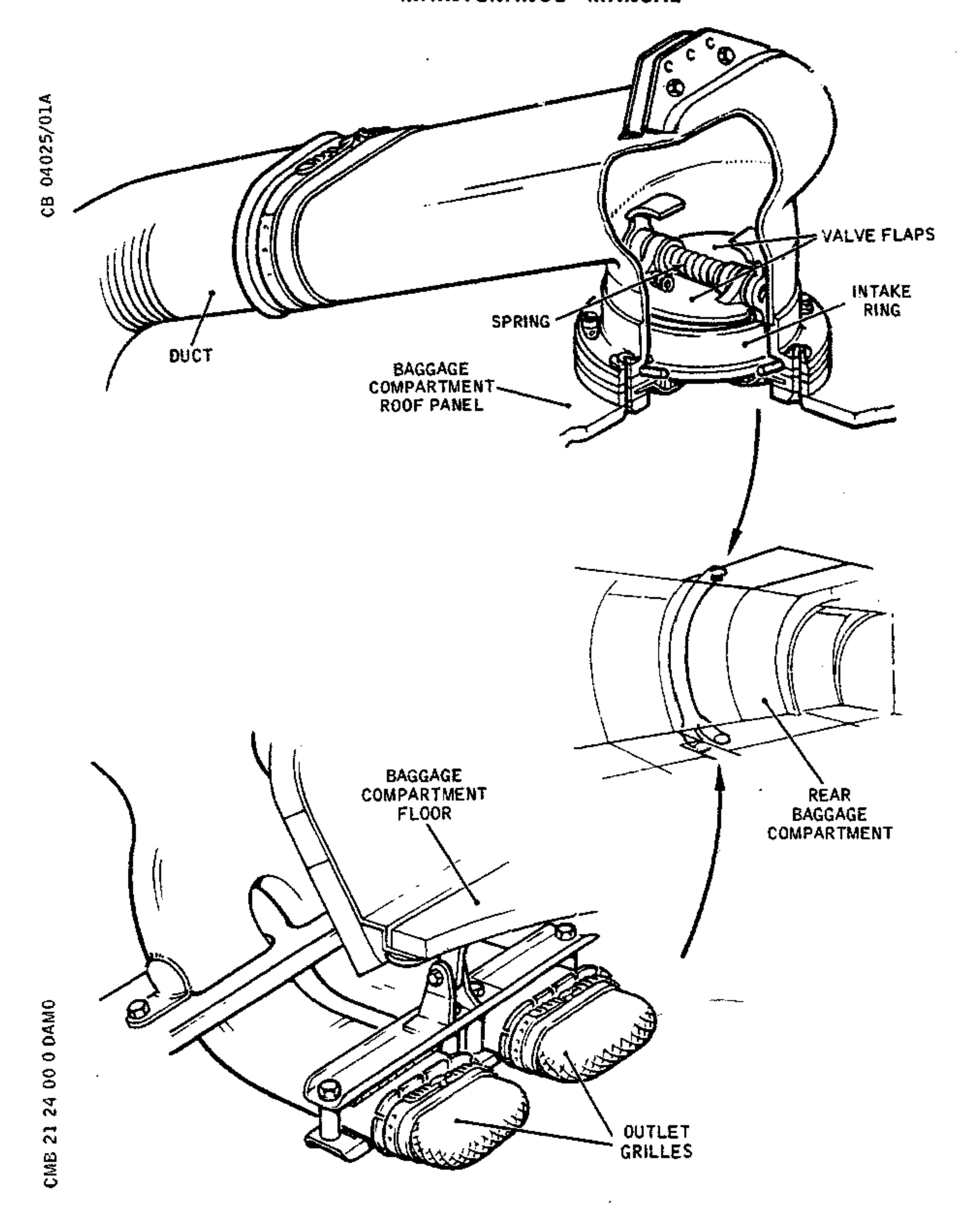
Duct joints are usually made with flexible joint sleeves secured by worm drive clips. Joints between components and ducts are made by joint sleeves, or clamping collars that secure the integral flanges of the compartment to those bonded to the duct.

Light alloy restrictors are fitted to the ends of some ducts to achieve the correct airflow throughout the system. Gaps between the ends of adjacent ducts allow for thermal expansion.

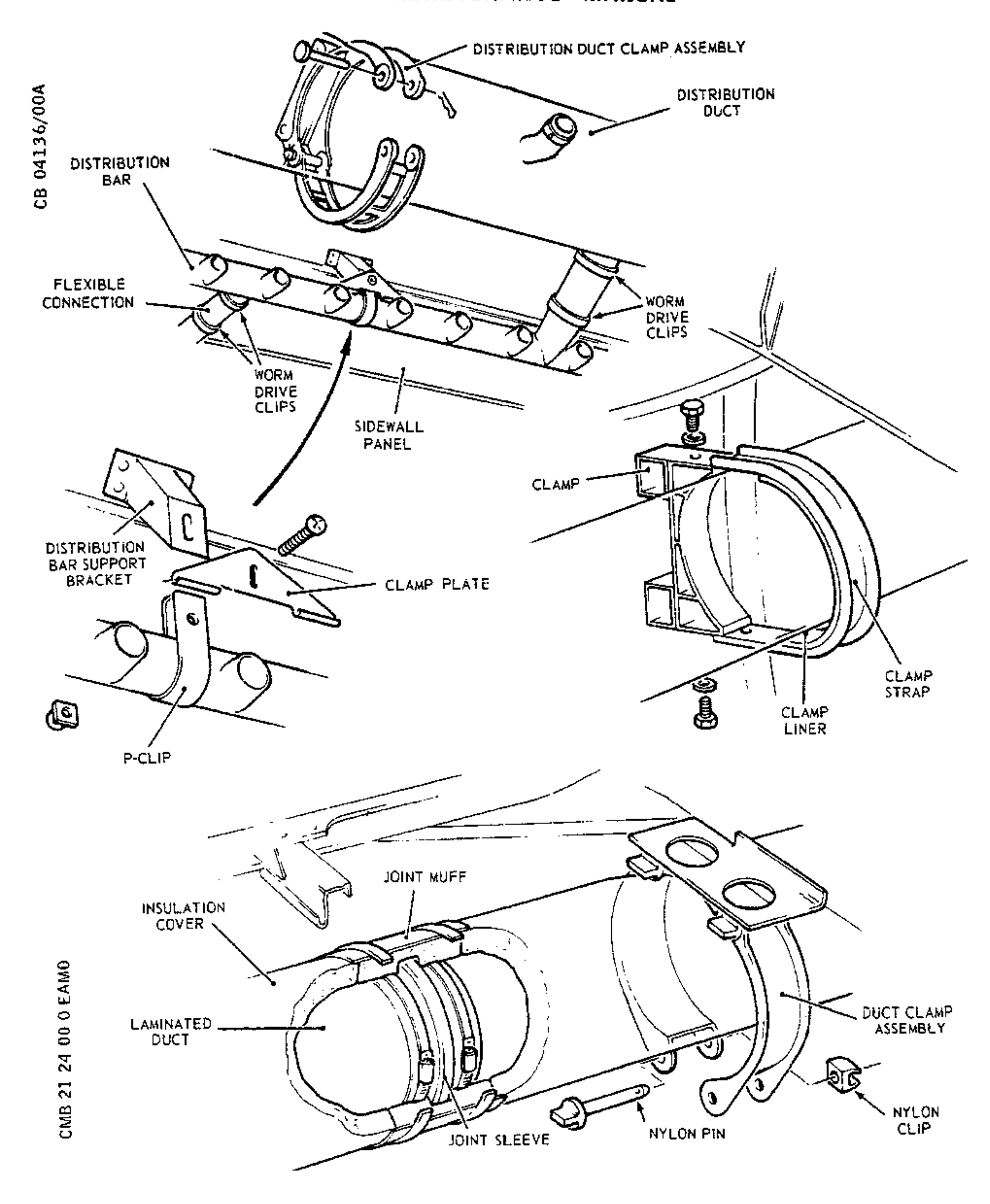
Ducts below the floor are insulated with glass fibre muffs covered with a rubberized fabric to prevent heat transference between the underfloor bays and the cooling air in the ducts. The riser and sinker ducts are set within, and form an integral part of, the fuselage
R insulation blankets. The distribution duct above the
R PSU's is also insulated with glass-fibre muffs. Duct joints are wrapped with layers of glass-fibre insulation which in turn is covered by an insulation cover secured with clips. The distribution bar, and the main air extraction ducts in the light-shade assembly, are not insulated.

Glass cloth ducts, insulation and insulation covers are repairable in-situ. Runs of ducting are secured to the structure at frequent intervals by cradles and clamps. Static-pressure testing stub pipes, which are sealed with rubber caps, are distributed at various parts of the system.

At one part of the system (Ref. Fig. 002), the underfloor air extraction duct and the underfloor air



R Non-return Valve
Figure 004

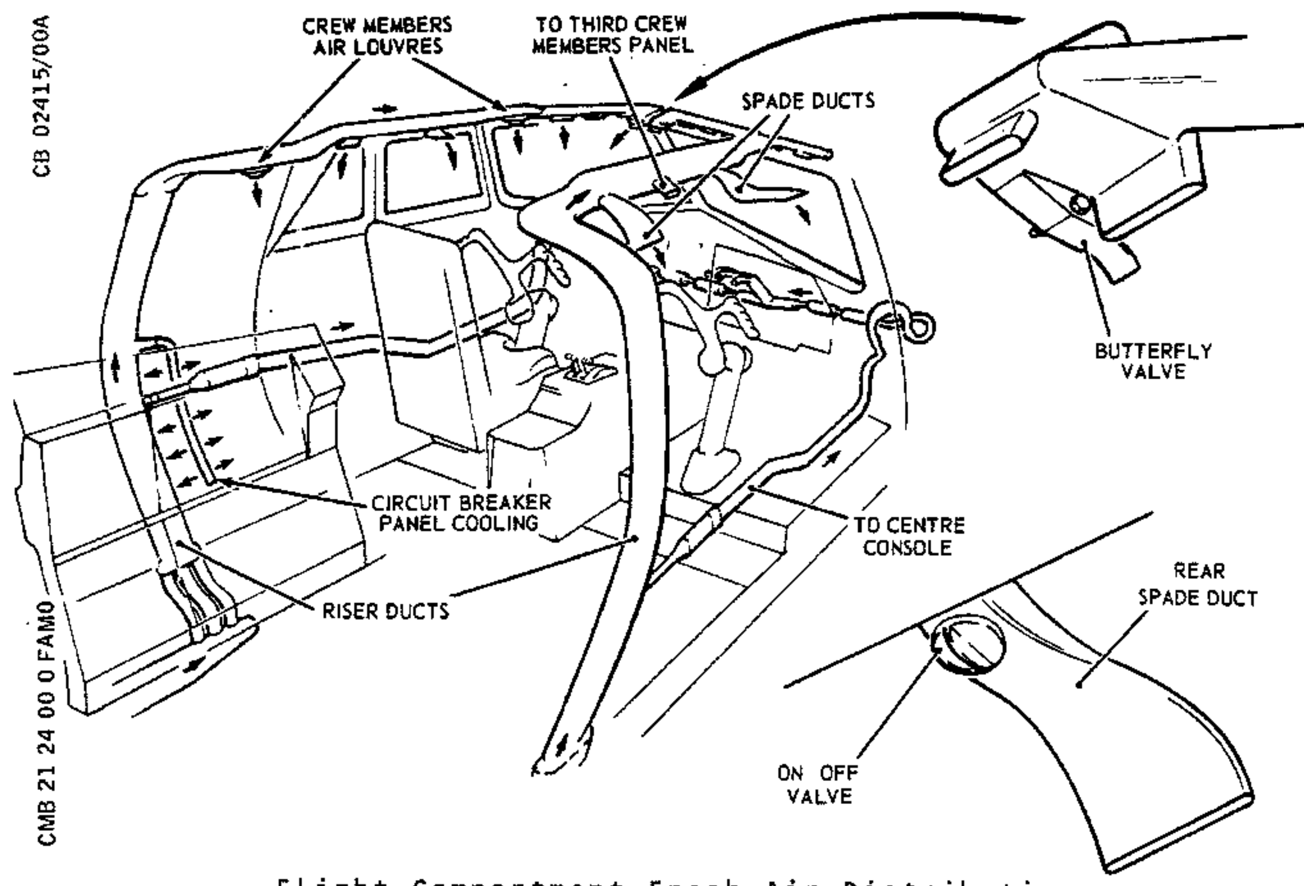


R

Duct Joints and Supports
Figure 005

supply duct, share a common insulation muff.

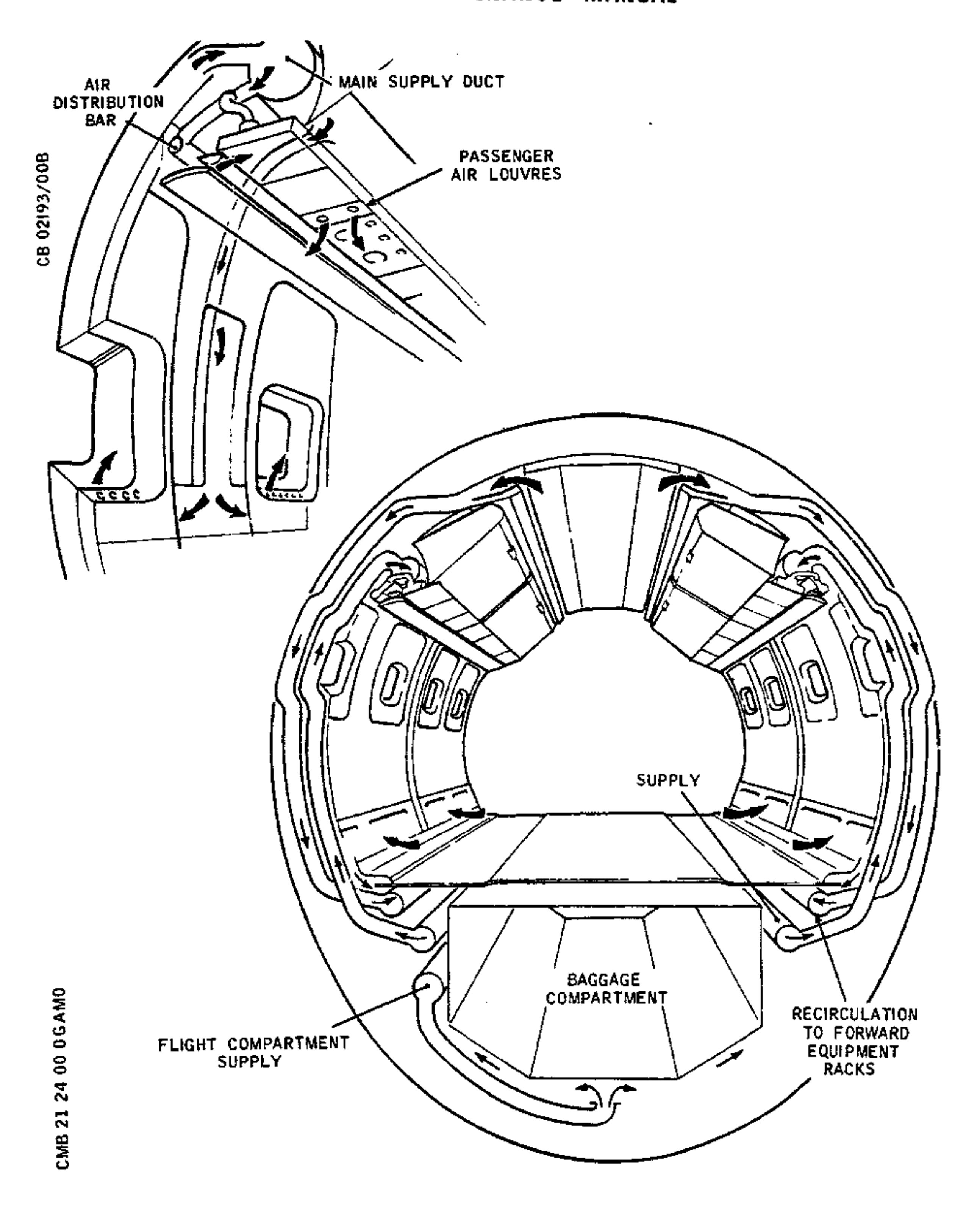
5. Operation (Ref. Fig. 006, 007 and 008)



R Flight Compartment Fresh Air Distribution - Air Flow
Figure 006

Fresh air is supplied to the flight compartment via a single, insulated, underfloor duct from the distribution manifold. Tappings from this duct supply cooling air to the underfloor baggage compartment and the forward vestibule. At a point nearly level with the equipment racking the main duct divides and, via riser ducts, supplies air to both sides of the compartment.

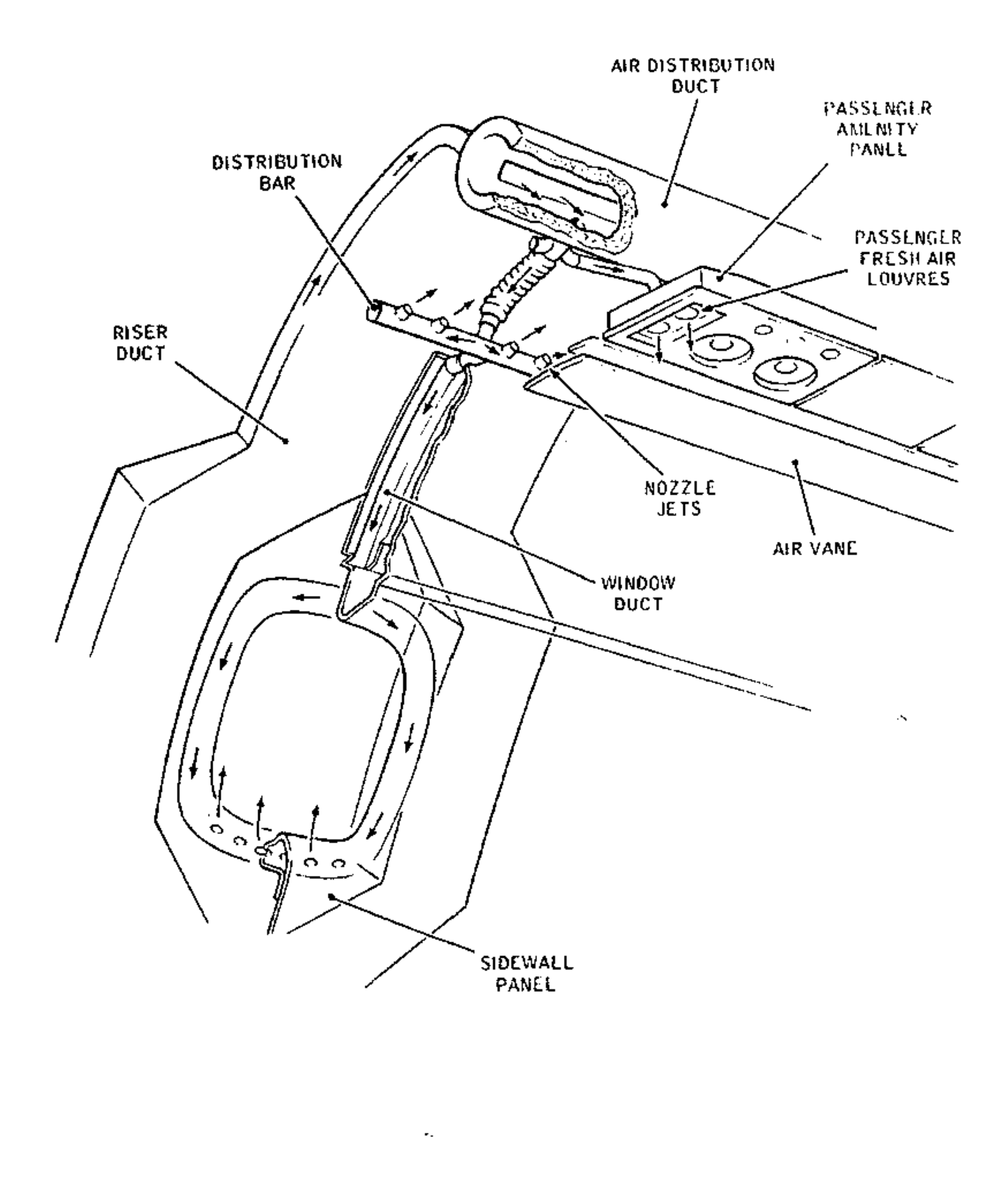
The fresh air supplied to the flight compartment cools the windshield, the direct vision windows and the side windows, by blowing over their inside surface from a series of slots and spade ducts. It also cools internally the third crew member's panels and the circuit breaker panels. An air louvre at each crew member's station can be adjusted on or off, and directionally, by the



Passenger Compartment - Air Flows
Figure 007

R

CB 04028/00B



CMB 21 24 00 0 HAMO

Passenger Compartment and Windows
- Air Flow
Figure 008

R

individual crew member. Two overhead louvres in the flight compartment, forward of the pilots' instrument panel, can be selected progressively between minimum and maximum, to supply cool air to this zone.

A fresh air spray duct in a ceiling panel of the flight compartment between the electrical racks, provides a curtain of cooling air separating the flight and passenger compartments. ON/OFF valves are installed in spade ducts supplying cooling air at the top inboard edge of the side windows, to allow the pilots to control the airflow at their shoulders.

The forward passenger compartment supply is carried from the distribution manifold to a position midway along the rear passenger compartment by an insulated, underfloor duct. At this point the duct divides to supply the left hand and the right hand sides of the compartment by means of riser ducts embodied in the fuselage thermal insulation. Air from the riser ducts passes into the main fresh air ducts which run the length of the compartment behind the luggage bins. These fresh air ducts supply air, through a number of small connecting pipes, to distribution bars running parallel to the main duct.

Air delivered to the distribution bars flows into the passenger compartment, through a series of nozzle jets which, together with the specially shaped trim member, effect efficient mixing with recirculating air. The distribution bars also supply air to window ducts which carry air around the window frame and blow it upwards, from small holes, to cool the inside surface of each window.

Air from the main fresh air ducts is supplied to the passengers through adjustable louvres in each amenity panel, to the toilet compartments through an outlet at roof
R level and to the forward, centre and rear vestibules. The
R vestibule supplies are discharged through grilles which, in
R the forward and rear vestibules, are adjustable.

The rear passenger compartment fresh air is supplied from the distribution manifold in a similar manner to that of the front passenger compartment supply.

Air is extracted by fans through roof-level ducts on either side of the passenger compartments. It then passes to below floor level through sinker ducts, into insulated underfloor ducts, through filters and the extraction fans to the flight compartment and underfloor equipment racks. Most of the remainder of the air is extracted through grilles at the bottom of the sidewall

furnishing panels on both sides of the passenger compartments, and passes freely into the underfloor space, where it flows freely and passes overboard via the cabin discharge valves and bleeds into the landing gear bays.

The forward baggage compartment is cooled, or heated, by air from the flight compartment air supply, through flexible ducts at nine frame bays along its length. This air circulates around the outside of the baggage compartment. A similar duct at the rear conveys cooling air to the radio altimeter units.

The rear baggage compartment is cooled by circulating fresh air through ducts between the sidewalls and the aircraft skin. Collector ducts convey this air to the bottom of the rear electronic racks. A small amount of fresh air is also passed behind the rear bulkhead of the baggage compartment and flows forward below the floor to the rear discharge valves.

FRESH AIR DISTRIBUTION - ADJUSTMENT/TEST

1. General

This test is to check the air flow at each fresh air outlet in the flight compartment and passenger compartment without the removal of the furnishing trim.

2. Operational Test

A. Prepare to Test

(1) Make available an air ground supply (Ref. 12-14-21).

(2) Remove the centre floor panels in the forward baggage compartment.

(3) Remove the bottom filter from the left and right hand rear electronic racks (Ref.21-21-52).

B. Test

(1) Check that there is a steady air flow from each of the outlets listed below, and that the individual air louvres and valves can be opened and closed satisfactorily.

(a) Flight Compartment

(a1) The butterfly valve, located overhead between the two pilots, controlling the air flow at the top inboard end of each windshield.

(a2) Each of the four crew members individual overhead louvres.

(a3) The spade ducts and slots supplying a cooling airflow to the top inboard surface of each windshield, direct-vision window and side window.

(a4) The ON/OFF valve, above each pilot, that supplies additional cooling air to the side window and the pilot.

(a5) The overhead spray duct between the electrical racks.

(b) Passenger Compartment

(b1) The head level air supply grilles in the forward, centre and rear vestibules.

(b2) The air supply grilles at roof-level in each toilet.

(b3) Each individual punkah louvre in the passenger amenity panel on the under surface of the luggage stowage bins.

(b4) The longitudinal aperture formed by the top edge of the air vanes and the luggage bins.

(b5) The lower rim of each window trim.

(c) Forward Baggage Compartment

Place the hand over the eight fresh air outlets in turn and check that there is a discharge of air from each.

(d) Rear Baggage Compartment

Place the hand over the circular opening in the floor of the left hand and right hand rear electronic racks and check that there is a discharge of air from each.

(e) Additional Air Bleeds

Check that a flow of air is apparent at the following positions:

(e1) The flight/crew oxygen bottle stowage.

(e2) The passenger oxygen bottle stowage.

(e3) The crew/passenger oxygen inter-connection in the forward vestibule.

(e4) The passenger oxygen control panel in the rear vestibule.

(e5) The underfloor radio altimeter transceivers.

C. Conclusion

(1) Switch off and disconnect the air ground supply

(Ref. 12-14-21).

(2) Refit the centre floor panels in the forward baggage compartment and secure with countersunk bolts. Torque load each bolt to between 20 and 25 lbf in (0.22 and 0.28 mdaN).

(3) Refit the filters to the left and right hand rear electronic racks (Ref.21-21-52).

R 3. Forward Baggage Compartment - Air Flow Test

A. Prepare to Check

(1) Make available a ground air supply (Ref. 12-14-21).

(2) Remove the centre floor panels in the forward baggage compartment.

B. Check

(1) Place the hand over each of the eight fresh air outlets in turn and check that there is a discharge of air.

(2) Refit the centre floor panels and secure with the countersunk bolts. Torque load to between 20 and 25 lbf in (0.22 and 0.28 mdaN).

C. Conclusion

(1) Switch off and disconnect the ground air supply (Ref. 12-14-21).

(2) Refit the centre floor panels in the forward baggage compartment and secure with the countersunk bolts. Torque load each bolt to between 20 and 25 lbf in (o.22 and 0.25 mdaN).

R 4. Rear Baggage Compartment - Air Flow Test

A. Prepare to Check

(1) Remove the bottom filter from the left and right hand rear electronics racks (Ref. 21-21-52).

B. Check

(1) Place the hand over the circular opening in the floor of the left and right hand rear electronics racks and check that there is a discharge of air

R from each.
R
R (2) Refit the left and right hand rear electronic rack
R filters (Ref. 21-21-52).
R
R C. Conclusion
R
R (1) Switch off and disconnect the ground air supply
R (Ref. 12-14-21).

RB
B FRESH AIR DISTRIBUTION - APPROVED REPAIR

1. Low Pressure Cabin Distribution Ducts - Temporary Repair

A. Duct may be taped with water proof tape P29 (Code NTPA 1048).

B. Fibreglass ducts may be repaired with fibreglass cloth 0.007 in (0.178 mm) and adhesive AV/HV115 (Code MAGC 0451). A minimum of three layers of cloth is required. Apply adhesive to cloth in small quantities, brushing adhesive into cloth for each layer.

B 2. Replace Flexible Pipe From Air Distribution Duct to Passenger
B Amenity Panel

B A. Damaged flexible pipe should be replaced by 1 in (25.4 mm)
B bore pipe P/N U624D cut to length.

B B. Make end cuffs by removing plastic helix from the end
B 1.5 in (38.1 mm). Turn half this end inside to double
B over. Retain cut end of helix by taping outside with
B pressure sensitive PVC or glass cloth tape.

B C. Secure to stub connections with cable tie P/N T30RW.

AIR LOUVRES (FLIGHT COMPARTMENT) - REMOVAL/INSTALLATION

1. General

There are four air louvres installed in the overhead ducts of the flight compartment.

2. Air Louvres (Ref. Fig. 401)

A. Remove

(1) Support the louvre, and remove the three torque set bolts and the washers securing the louvre housing to the duct. Remove the louvre.

(2) Secure a blank cover over the louvre aperture in the duct.

RB B. Assembly of Alternative Louvre (Pt. No. 2368)

RB (1) Manufacture backing plate in accordance with drawing No.
RB 4-44620.

RB (2) Rivet alternative louvre (Pt. No. 2368) to backing plate
RB using SP68-607 specification rivets (4 off) and cut to size
RB accordingly.

RB (3) Drill three holes in backing plate to align with existing
RB fixing holes for louvre orifice.

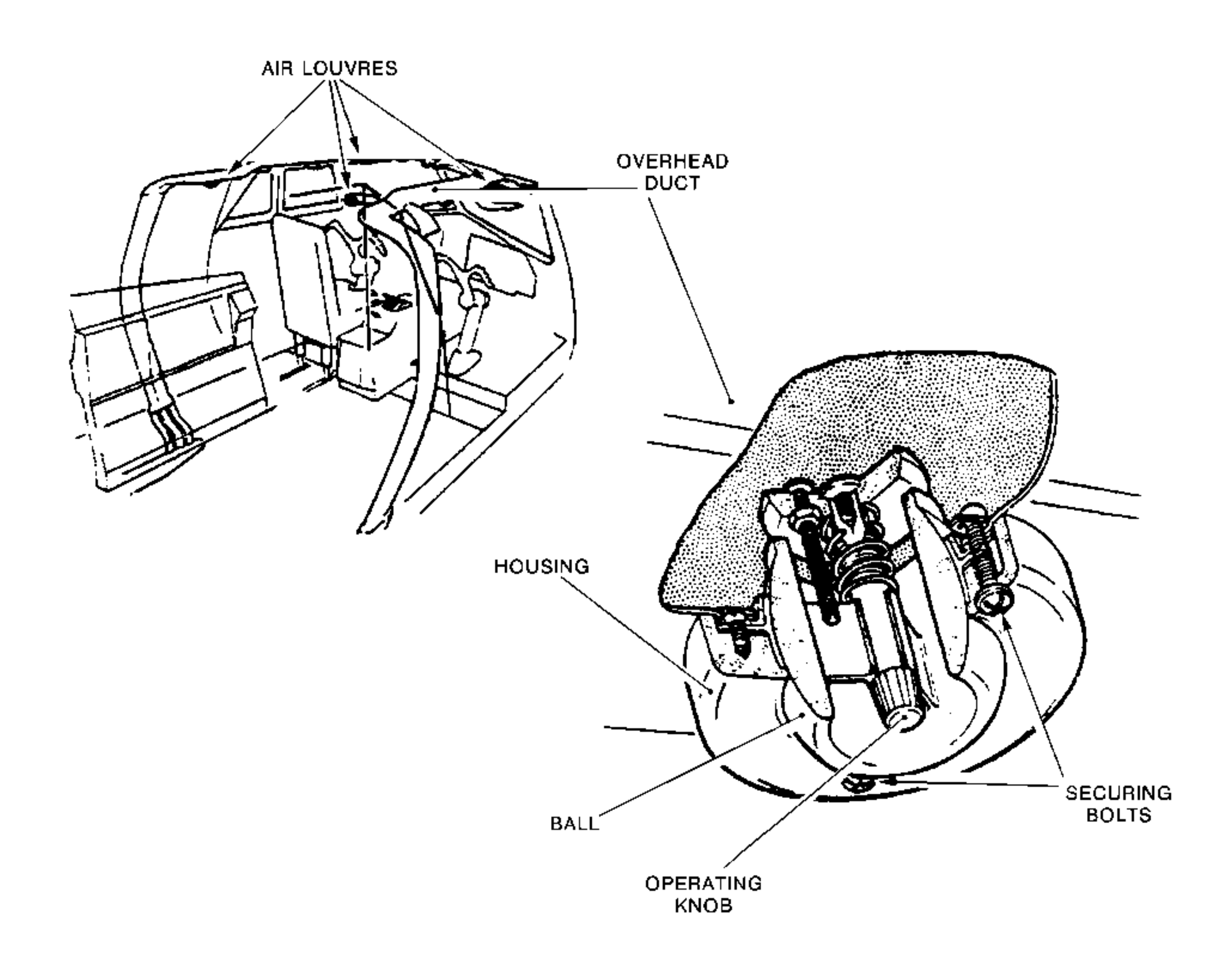
RB C. Install

(1) Remove the blank cover from the duct, and visually inspect the louvre aperture for damage and debris inside the duct.

(2) Temporarily support the louvre in position, and secure it to the duct with three torque set bolts and washers. Hand tighten the bolts.

(3) Operate the centre knob of the louvre to ensure that the valve opens and closes satisfactorily, and that the ball swivels on its axis.

RB (4) Check for satisfactory airflow from the louvre (Ref.
RB 21-24-00, Adjustment/Test).



CMB 21 24 11 4 AAM0

Air Louvres - Installation
Figure 401

AIR LOUVRES (FLIGHT COMPARTMENT) - CLEANING/PAINTING

1. General

The four flight compartment fresh air louvres must be clean and dry and free from any tacky deposit that may lead to the accumulation of dust.

2. Cleaning

(1) Remove the air louvres as detailed in 21-24-11, Removal/Installation.

(2) Clean thoroughly by brushing all parts in a 1 per cent solution of Teepol in clean cold water and wipe with a Kimwipe tissue.

(3) Dry by blowing with clean dry compressed air.

(4) Refit the air louvres as detailed in 21-24-11, Removal/Installation.

AIR LOUVRES (FLIGHT COMPARTMENT) - REPAIR

1. General

There are four air louvres installed in the overhead ducts of the flight compartment. The air louvre balls must be tight in the air louvre sockets for efficient operation.

2. Repair

A. Procedure

RB NOTE: The following procedure is applicable to air louvres,
RB Pt. No. LPR2C.

(1) Remove the air louvre as detailed in Removal/Installation.

(2) Disassemble the ball from the socket by removing the three securing screws.

(3) Remove old felt material from the socket assembly.

(4) Clean all surfaces to be re-covered using Isopropyl Alcohol solvent (ARDROXIPA) (20-30-00, product No. 498).

(5) Cut material (Part No. V14L25804SA) to shape, adding vents as required to fit the contours of both parts of the socket.

(6) The material is self-adhesive, apply to the socket surfaces.

(7) Re-assemble the air louvre using the original three screws removed in operation (2).

(8) Check that the ball is able to move correctly within the socket.

(9) Refit the air louvre as detailed in Removal/Installation.

(10) Check the air operation of the air louvre (Ref. 21-24-00, Adjustment/Test).

FRESH AIR DISTRIBUTION BARS - REMOVAL/INSTALLATION

1. General (Ref. Fig. 401)

All fresh air distribution bars are of similar material and construction and are connected and secured by similar fittings. The distribution bars are not insulated. During removal and installation the fresh air supply system may be operating or not, as required.

2. Distribution Bars

A. Remove

(1) Loosen the screws securing the air fairing sections by inserting a screwdriver down the air gap between the fairing and the furnishings. Lower and remove the required number of air fairing sections.

(2) Disconnect the flexible hoses connected to the distribution bar.

(3) Release the cable ties securing the distribution bar to the brackets and the distribution ducting; remove the distribution bar.

B. Installation

(1) Ensure that the distribution bar and the bars and ducts to which it is connected are clean and free from obstruction.

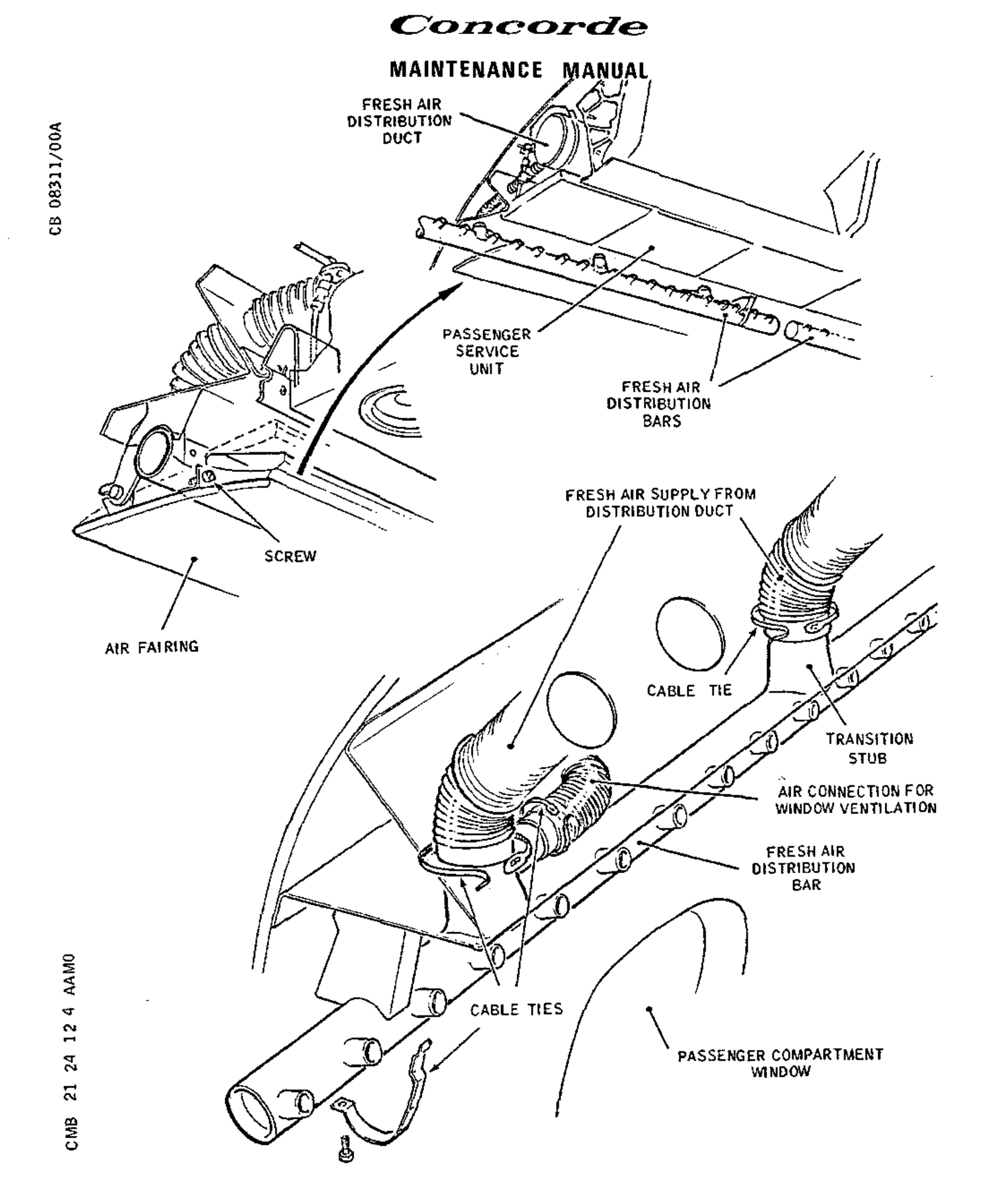
(2) Place the distribution bar in position in the brackets and secure with the cable ties.

(3) Connect the flexible hoses and secure with the cable ties.

CAUTION: WHEN CONNECTING THE FLEXIBLE HOSE FOR WINDOW VENTILATION, REASONABLE CARE MUST BE TAKEN NOT TO OVERSTRAIN THE TRANSITION STUBS.

(4) Settle the distribution bar in position and finally tighten the bracket cable ties.

(5) With fresh air supply system operating (Ref.21-24-00, Adjustment/Test), feel by hand for air leaks at the flexible hose joints and any repaired areas, and rectify as required.



Fresh Air Distribution Bar - Installation
Figure 401

(6) Refit the air fairings.

(7) Clean the adjacent area as necessary with a damp cloth.

FRESH AIR DISTRIBUTION BARS - APPROVED REPAIRS

1. General

Damage to transition stubs on the fresh air distribution bars is likely to take the form of a crack or split as illustrated at points 'X' and 'Y' (Ref. Fig. 801). These can be temporarily repaired but a permanent repair must be made as soon as possible.

2. Temporary Repair

A. Materials and Equipment

DESCRIPTION	PART NO.
Solvent, BACM 302 (Ref.20-30-00, No,473)	-
Waterproof silicone carbide paper, grade 320	-
Adhesive, Boscoprene 2402 (Ref.20-30-00, No.328)	-
Thinners, Bostick 6530 (Ref.20-30-00, No. 331)	-
Self-adhesive tape, Scotch 3M Type 27	-
Matt black acrylic paint, CM631,027	-

B. Preparation

(1) Remove the affected distribution bar as described in 21-24-12, Removal/Installation.

(2) Clean the surfaces to be bonded by wiping them with a clean paper tissue moistened with solvent.

(3) Dry abrade the surfaces with 320 grade waterproof silicone carbide paper to achieve a fine matt finish.

(4) Thoroughly clean the treated surfaces with a clean paper tissue moistened with solvent and wipe dry with a clean dry tissue.

(5) Mix the Boscoprene 2402 adhesive kit in the base to

accelerator ratio of 20:1 by weight as described in the suppliers instructions, or in smaller quantities, provided the same ratio of mix is used. After mixing add 50 per cent by volume of the thinner, Bostick 6530.

Note: The pot life of the mix is eight hours at room temperature (65-77 deg F, 18-25 deg C).

C. Temporary Repair

(1) Brush one even coating of the adhesive on the mating surfaces, where possible, and allow to stand in air for a period of 2 minutes minimum to 20 minutes maximum before assembly.

(2) When the applied adhesive reaches the tack-free state and provided the minimum of 2 minutes has expired, press the surfaces together. If the crack or split is small, the adhesive should be inserted and the surfaces pressed together.

(3) Smooth out all air bubbles from the joint without disturbing the mated surfaces and allow to dry.

(4) Bandage the joint with Sctoch 3M Type 27 self adhesive tape as shown in the illustrations (Ref. Fig. 801), maintaining a continuous overlap of tape.

(5) Paint the repaired area with a light coat of matt black acrylic paint and allow to dry.

(6) Refit the repaired distribution bar and test for leaks by feel with normal air supply operating (Ref. 21-24-00 Adjustment/Test).

3. Permanent Repair

A. Equipment and Materials

DESCRIPTION	PART NO.
Solvent, BACM 302 (Ref.20-30-00, No.473)	-
Waterproof silicone carbide paper, grade 320	-
Adhesive, Boscoprene 2402 (Ref.20-30-00, No.328)	-

DESCRIPTION	PART NO.
Thinners, Bostick 6530 (Ref.20-30-00, No.331)	-
Matt black acrylic paint, CM631,027	-

B. Preparation

(1) Carry out the preparation described in para.2, removing the damaged stub from the distribution bar and thoroughly cleaning the repair area.

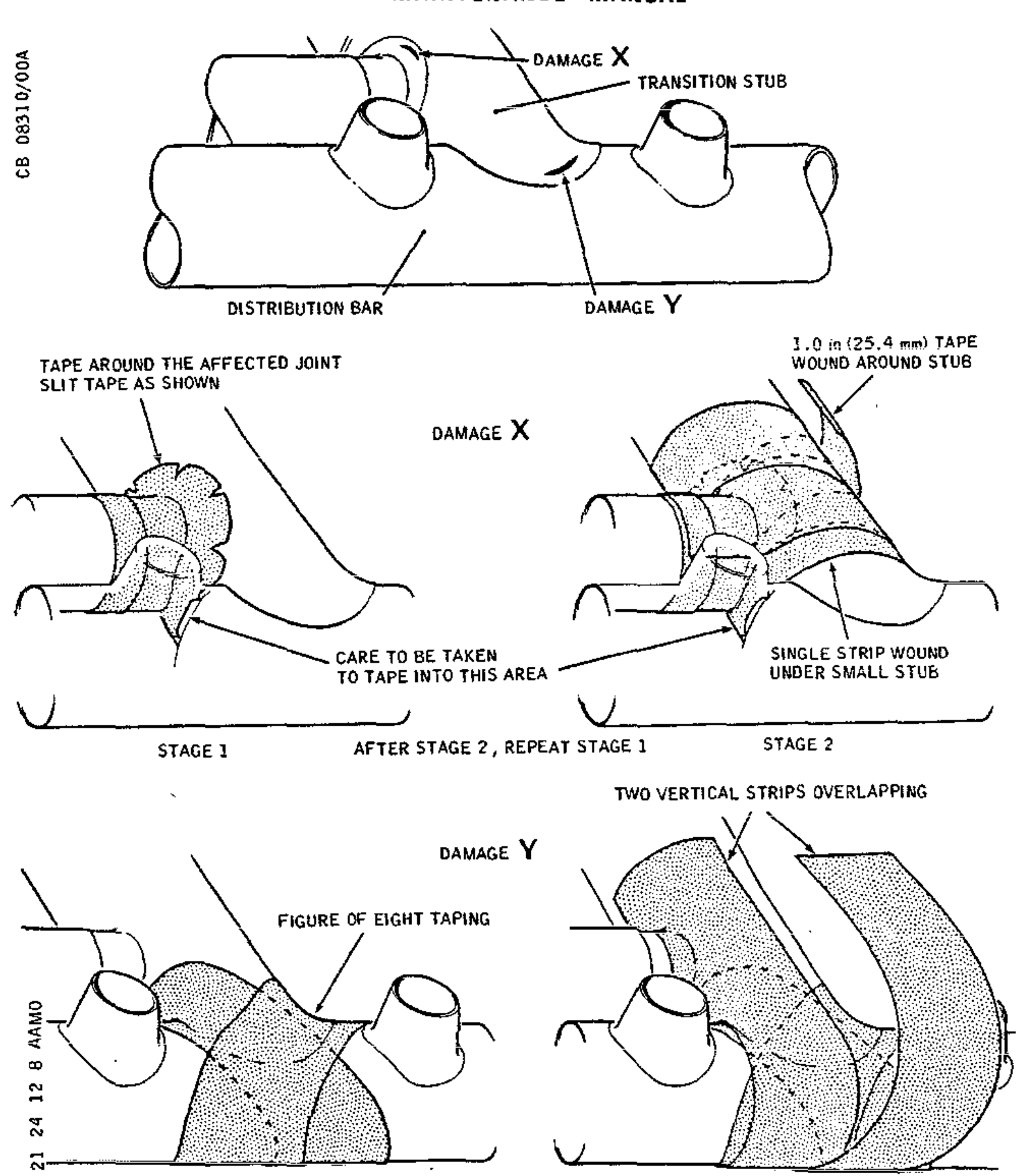
C. Permanent Repair

(1) Brush one even coating of the adhesive on the mating surfaces of the new stub and the distribution bar and leave until tack-free.

(2) Press the mating surfaces firmly together and smooth out all air bubbles.

(3) Paint the repaired area with a light coat of matt black acrylic paint.

(4) When dry, refit the repaired distribution bar and test for leaks by feel with normal air supply operating (Ref. 21-24-00, Adjustment/Test).



Transition Stub Repair
Figure 801

PASSENGER COMPARTMENT DISTRIBUTION DUCTS - REMOVAL/INSTALLATION

1. General

The fresh air distribution ducts are insulated and run along each side of the passenger compartments behind the overhead stowage bins and shear web panels. They are fed through riser ducts embedded in the sidewall insulation. The joints between lengths of ducting are located behind the feature brackets. This topic describes the removal and installation of a typical section of ducting.

2. Distribution Ducts (Ref. Fig. 401)

A. Equipment and Materials

DESCRIPTION	PART NO.
Sealant RTV731 (Ref. 20-30-00, No. 364)	-

CAUTION: THE AIR EXTRACTION SYSTEM MUST BE OPERATING IF ELECTRICAL POWER IS CONNECTED TO THE AIRCRAFT.

B. Prepare to Remove

(1) Turn off the conditioned air supply if operating.

(2) Remove the required number of overhead stowage bins (Ref. 25-21-22, Removal/Installation).

(3) Remove the required number of passenger service units (Ref. 25-21-21, Removal/Installation).

(4) Remove the required number of fresh air distribution bars (Ref. 21-24-12, Removal/Installation).

C. Remove

(1) Remove the insulating muff covering the duct sleeve joints behind the feature brackets.

(2) Remove the Minox clips securing the duct joints and push back the duct sleeves.

(3) For ducts which are connected to a riser duct, remove the screws securing the riser duct flange joint and

free the joint by inserting a suitable sharp edged tool.

(4) Remove the nylon pins which secure the duct mounting clamp straps, lower the section of duct and remove.

(5) Remove the attached flexible hoses or not, as required.

(6) Fit blank covers to the open ends of ducting.

D. Install

(1) Remove blank covers and clean the joint faces of the loose and fixed ducting.

(2) Place the duct joint sleeves and Minox clips on the duct ends, raise the duct section into position and secure by engaging on the sleeve joints with the adjoining ducting.

(3) When a riser duct is to be connected apply sealant (Ref. 20-30-00,No.364) to the joint faces and assemble the joint complete with all washers and screws. Tighten the riser duct joint securing screws evenly and hand tight.

(4) Work the duct and sleeve joints into the required position and secure by tightening the Minox clips hand tight.

(5) Fit the insulating muffs over the sleeves and secure with cables ties.

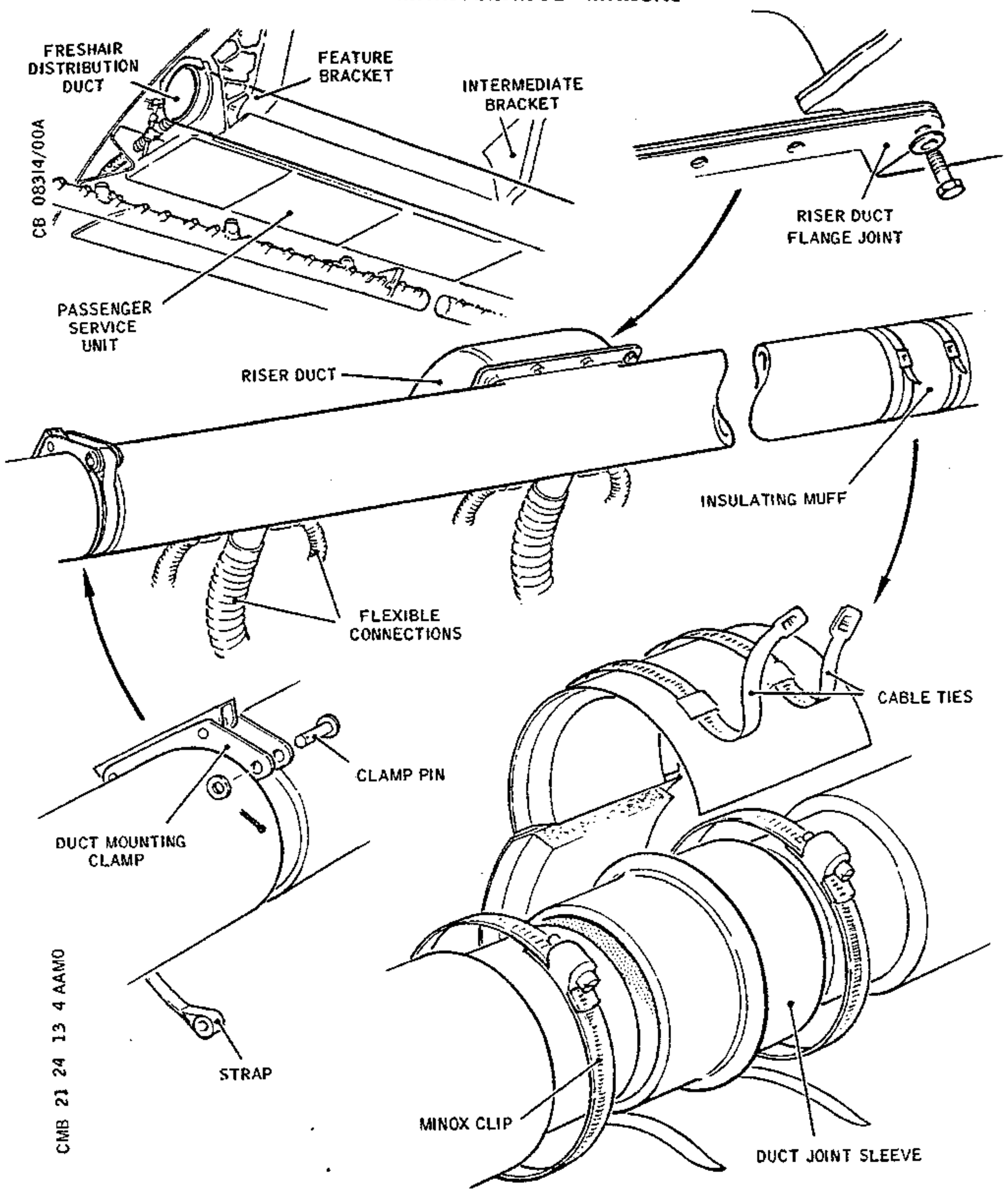
(6) Raise the lower half of the duct mounting clamps into position and secure with the nylon pins, washers and split pins.

(7) Attach the flexible hoses required for window ventilation, fresh air distribution and passenger service units and secure with cable ties.

(8) Install the associated fresh air distribution bar (Ref. 21-24-12, Removal/Installation).

(9) Install the associated passenger service units (Ref. 25-21-21, Removal/Installation).

(10) Operate the ground conditioned air supply and feel all joints by hand for air leaks. Rectify as



Passenger Compartment Distribution Duct - Installation
Figure 401

necessary.

(11) Install the associated overhead stowage bins (Ref. 25-21-22, Removal/Installation).

(12) Refit the associated air fairings.

(13) Clean the adjacent area as necessary with a damp cloth.

VAPOUR SEAL/FUEL TANK INTERSPACE VENTILATION SYSTEM - DESCRIPTION AND OPERATION

1. General (Ref. Fig. 001)

Three independent ventilation systems provide a fuel vapour barrier between the fuselage fuel tanks and the pressurized passenger and baggage compartments. Each system is also capable of draining or syphoning overboard, fluids which may collect as the result of condensation or a fuel leak from the fuselage tanks.

The system comprises air inlet grilles, filter, non-return valves, seal membranes and ducts, which facilitate an airflow from the passenger compartment and the underfloor space, to the enclosed but ventilated airspace formed between the seal membrane and the tanks. Air bleeds from this airspace are connected to vent pipes which duct the ventilating air overboard in association with the drains.

2. Seal Membranes (Ref. Fig. 002)

These membranes, which are fabricated from a Viton coated fabric extend over the top of tanks 6, 8, 10 and 9, and the forward bulkheads of tanks 9 and 11. The membrane is attached and sealed to the aircraft and tank structure by brackets, clamps and membrane supports, and covered with insulation blankets (Ref. 25-72-00). The air supply duct is fabricated as an integral part of the seal membrane. Airtight zip fasteners are incorporated in the membranes to provide limited access to the catenary floor.

3. Non-return Valve (Tank 11 Vapour Seal Membrane)

A low pressure non-return valve (NRV) is attached with binding wire to the vapour seal end of the air inlet duct to the vapour seal. The NRV is a sphincter type of valve, made of a nitrile/PVC compound.

With a differential pressure of 0.1 in WG between the passenger compartment and the vapour seal the NRV opens
R and allows the air to flow from the LH rear baggage
R compartment wall duct into the vapour seal air space.

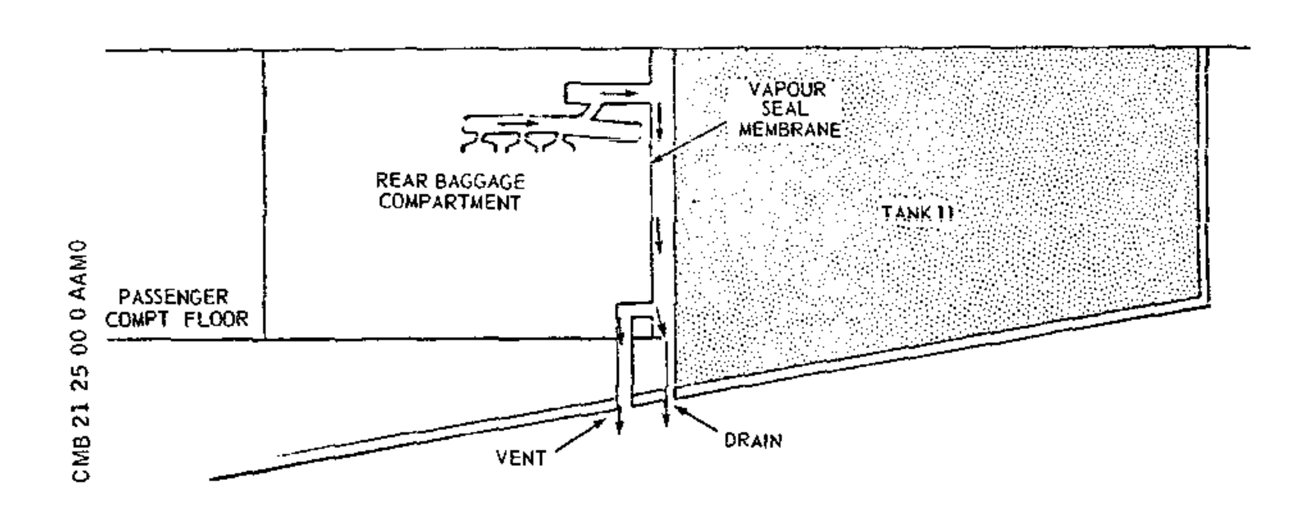
4. Non-return Valve (Tanks 6, 8, 9 and 10 Vapour Seal Membranes)

A low pressure non-return valve (NRV) is fitted to the air inlet of each vapour seal air supply duct. The NRV is

VENT PIPE
VAPOUR SEAL MEMBRANE
PASSENGER COMPT FLOOR
AIR SUPPLY DUCT
AIR INLET
AIR BLEED
TANK 9
TANK 10
TANK 8
CATENARY FLOOR
VENT AND DRAIN
DRAIN
VENT

CB 04276/00B

AIR INLET
PASSENGER COMPT FLOOR
VENT PIPE
AIR SUPPLY DUCT
VAPOUR SEAL MEMBRANE
CATENARY FLOOR
AIR BLEED
TANK 6
VENT
DRAIN



R

Fuel Tank Vapour Seals Ventilation - Schematic
Figure 001

a simple gravity action, single flap valve, with piano wire hinge.

With a differential pressure of 0.1 in WG between the underfloor space and the vapour seal, the NRV opens, and allows the air to flow from the underfloor area into the vapour seal airspace.

5. Non-return Valve - Tank 9 Vapour Seal Forward Drain
(Ref. Fig. 002)

A pressure operated flap drain valve is fitted in the vapour seal interspace forward of tank No.9, to permit fuel and moisture drainage at this point when the aircraft is on the ground and to augment the syphon action in flight.

6. Debris Guards

Ingress of small particles into the underfloor fuel vapour ventilation system is prevented by a fine mesh wire grille at the entry to each duct.

7. Vents and Drains

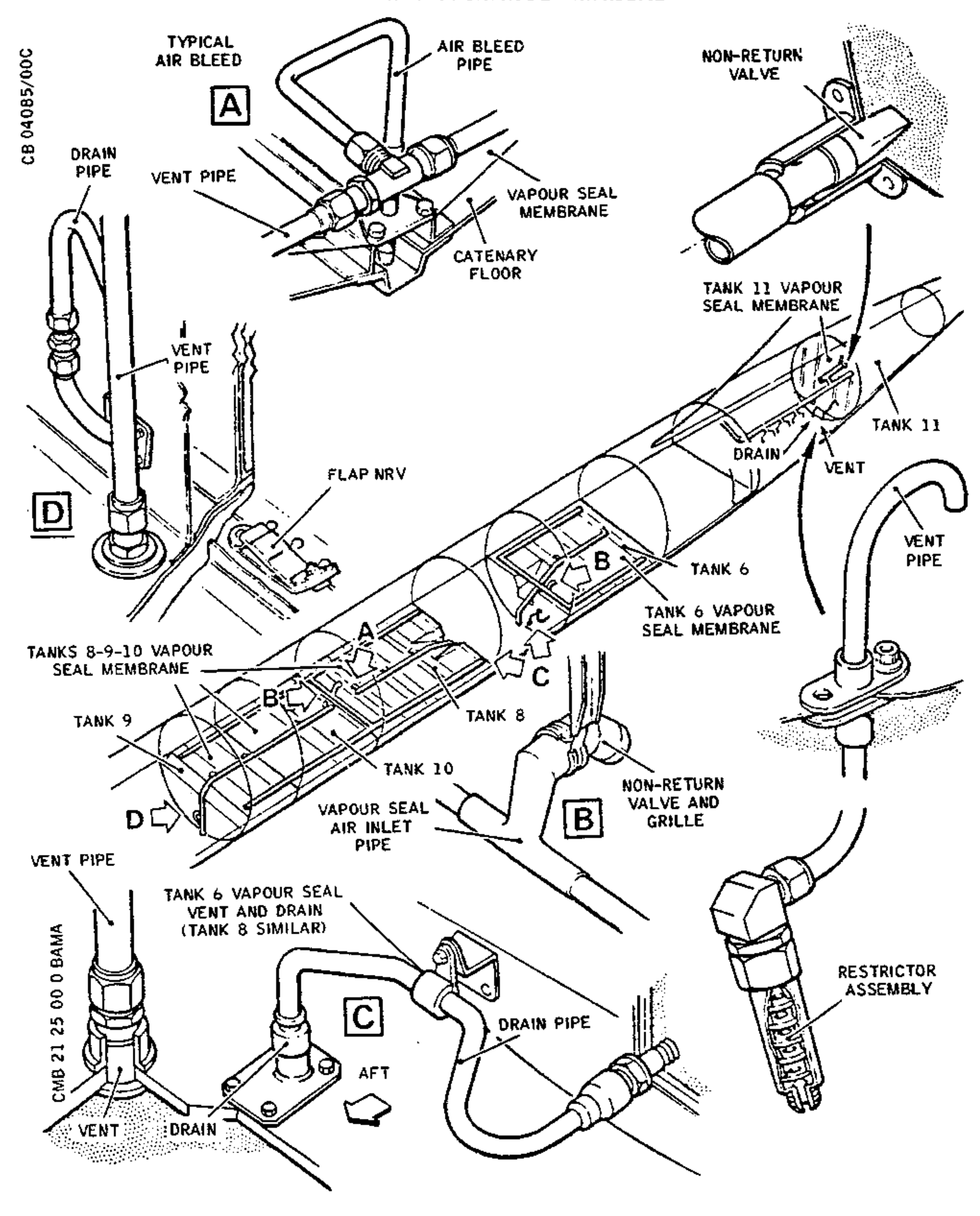
The vapour seals are vented by rigid steel pipes which connect each air bleed to atmosphere. The air bleeds are bolted to the top of the vapour seal membrane and the pipe of each bleed extends into the vicinity of the vapour seal air space where leaked fuel would collect. A restrictor, which is calibrated at the build stage, is set in the outlet vent from tank 11 vapour seal.

The drain pipes are set at low point of the vapour seal air space, and a restrictor similar to the vent restrictor is set in the drain from tank 11 vapour seal.

8. Ducts

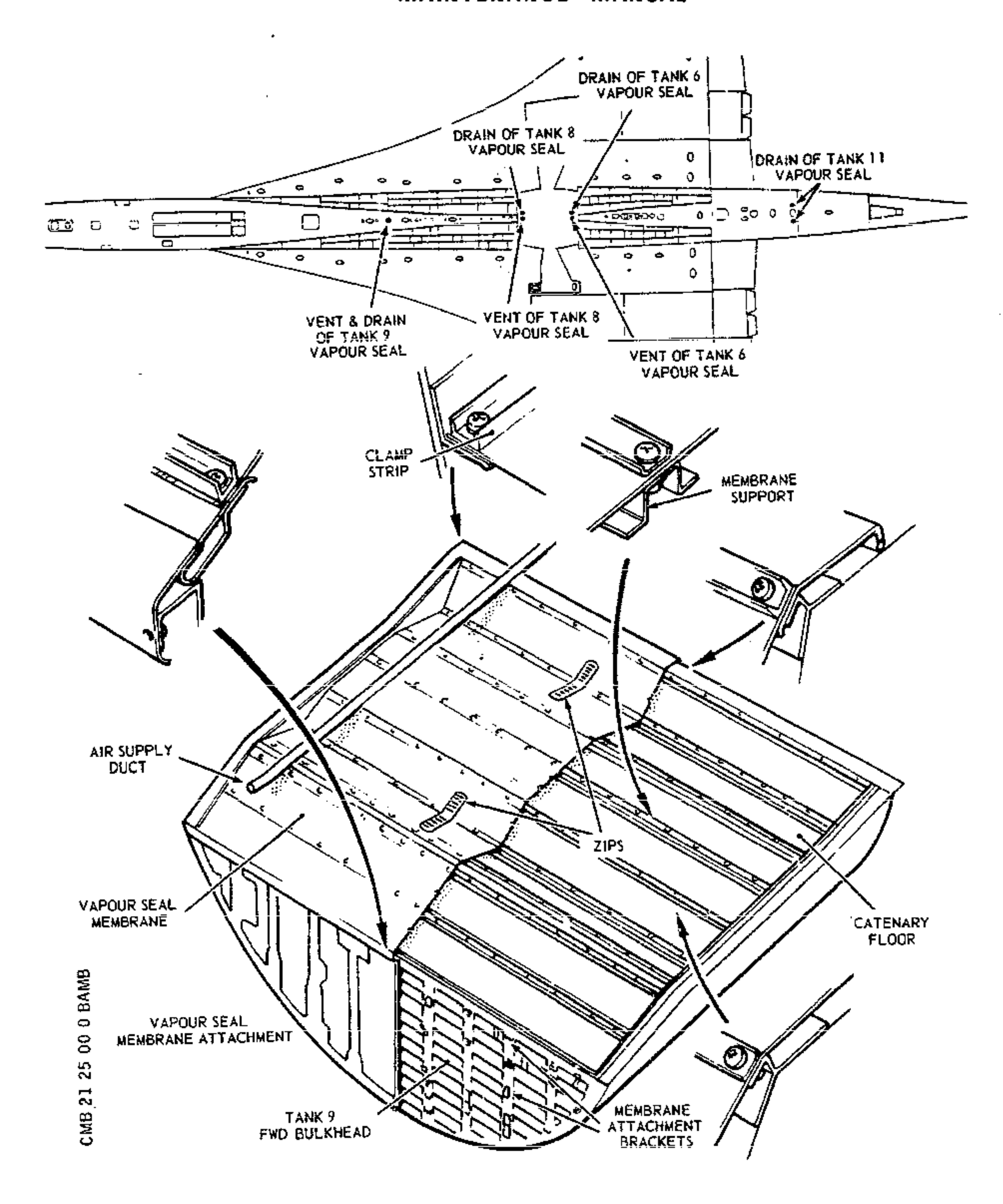
The air supply duct to the vapour seal on tank 11 is fed by a branch from the LH rear baggage compartment wall cooling duct in the roof of the rear baggage compartment, and terminates at the NRV in the vapour seal. The duct, which is impervious to fuel vapour, is made of rigid resin impregnated glass cloth.

Air supply ducts to the underfloor vapour seals, are partly integral with the seal membranes, and partly made from rigid metal pipes. The metal ducts which contain a NRV at the inlet are connected to the membrane ducts by corrugated flexible pipes and clips. Holes through the duct and membrane, which allows the air into the seal airspace, are



Fuel Tank Vapour Seals Ventilation (Sheet 1 of 2)
Figure 002

R



Fuel Tank Vapour Seals Ventilation (Sheet 2 of 2)
Figure 002

R

pitched at regular intervals along the ducts.

9. Operation (Ref. Fig. 001)

Passenger compartment discharge air is ducted from the underfloor space and the rear galley area, to flow through the systems and then discharge overboard, as shown in the schematic airflow diagram. Cabin differential pressure causes the air to flow, and there are no manual or automatic controls of the system.

Fuel leaking into the vapour seal air space is passed overboard either by gravity feed through the drain pipes, or siphoned off by the air bleeds into the vent pipes from the low points of the catenary floor, and the lower part of tank 11 vapour seal.

R

In the event of the forward bulkhead of tank 9 leaking, fuel which would accumulate to the top of the siphon tube when the aircraft is grounded and unpressurized, is drained to atmosphere via a 1/4 in (6.35 mm) dia. drain hole in the bottom of the vapour seal.

VAPOUR SEAL/FUEL TANK INTERSPACE VENTILATION - ADJUSTMENT/TEST

WARNING: OBSERVE THE FUEL SAFETY PRECAUTIONS DETAILED IN 28-00-00. OBSERVE THE LANDING GEAR SAFETY PRECAUTIONS IN 32-00-00.

CAUTION: TAKE CARE WHEN WORKING IN THE VICINITY OF THE THIN VAPOUR SEAL MEMBRANE. DO NOT ALLOW THE PRESSURE IN THE VAPOUR SEAL INTERSPACE TO EXCEED 4 in WG (10 mb) AND PRESSURE INCREASE MUST BE GRADUAL.

NOTE: All pressure/leak/flow test pipes to be 0.5 in (12.7 mm) diam.minimum.

1. General (Ref. Fig. 501)

Vapour seals are fitted to the fuselage cell of fuel tanks 6, 8, 9 and 10, and to the forward bulkhead of fuel tank 11. Flow and leak tests must be performed to ensure efficient disposal of fuel vapour overboard from the space between the fuel tanks and the vapour seal membrane. A pressure test to locate air leaks of the vapour seal must be carried out should the leak test prove unsatisfactory.

The ventilation air intake for tanks 8, 9, 10 is located approximately centrally in the underfloor space. The debris guard and non-return valve (NRV) are easily accessible on removal of the floor panels.

The ventilation air intake for No. 6 tank is located in the underfloor space above the forward end of the tank. The debris guard and NRV are easily accessible on removal of the floor panels.

R The ventilation air for No.11 tank bulkhead is taken from a
R branch in the LH cooling air duct in the roof of the rear
R baggage hold. The sphincter type NRV is located at the
R vapour seal end of the duct.

The vapour seal for tanks 8, 9, 10 is vented and drained from both ends. At the forward end, the catenary area vents and the bottom drain are brought together to a single skin fitting on the centre line of the aircraft near the aerial fin. The fitting has a threaded orifice for the attachment of instruments. At the rear end, the catenary area vent is taken to a similar skin fitting in the forward edge of the landing gear bay and is placed approximately centrally. The bottom drain is piped to a point about 18 in (45 cm) to the left of the vent fitting and terminates in a riveted skin fitting with a faired cover plate.

The vent and drain for No. 6 tank are taken to two

corresponding skin fittings in the rear edge of the landing gear bay.

The vent and drain for No.11 tank bulkhead are taken to two rearward sloping orifices below the bulkhead and immediately to the rear of access panel 153FB.

2. Equipment and Materials

	DESCRIPTION	PART NO.	QTY
RB	Negative pressure rig (depression of 4 in WG (10 mb)	M125 (Vacuum pump)	2
	Air pressure rig (pressure of 4 in WG (10 mb)	-	1
	Water manometers (pressure of 4 in WG (10 mb)	-	2
	Adaptor blanks	-	2
	Flowmeters with connectors (0.500 litres/min)	-	3
	Pressure blanks	-	A/R
	Stopwatch	-	1
RB	Rotometer 0 to 100 litres/min	-	1
	Staging	-	A/R

3. Flow Test, Tanks 8, 9, 10 and 6 Vapour Seals (Ref. Fig.502)

A. Prepare to Test

(1) Open the main landing gear doors as detailed in 32-00-00.

(2) Remove the floor covering to expose the required floor panels as detailed in Table 501 and remove and retain the countersunk bolts from the edge of the panels.

(3) Locate the lifting tapes at the edge of each panel, and remove the panels.

Vapour Seal/Fuel Tank Interspace Ventilation
Vent and Drain Outlets
Figure 501

PASSENGER COMPT FLOOR

AIR SUPPLY

TANK 9

TANK 10

TANK 8

FLOWMETER

FLOWMETERS

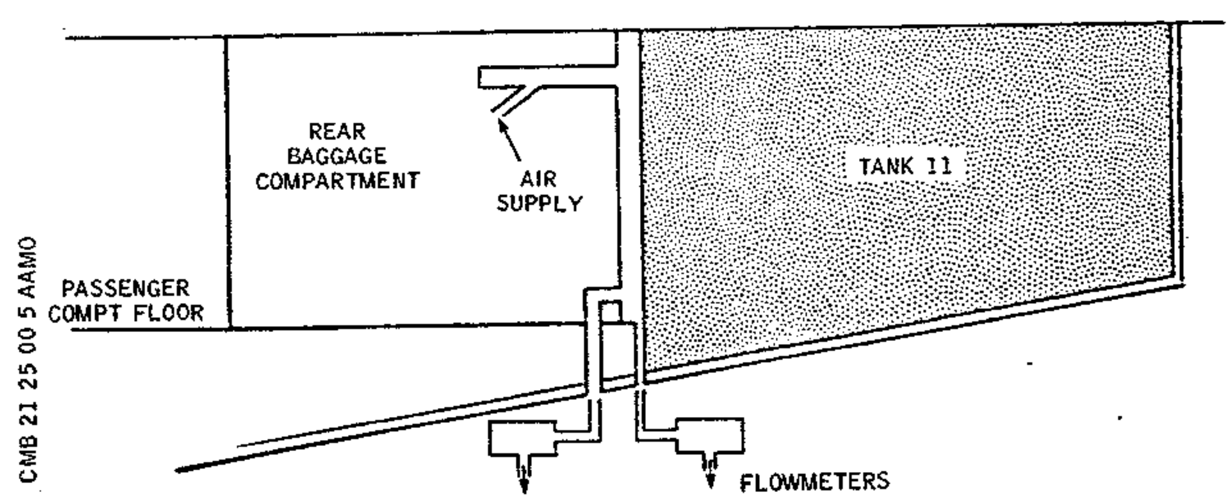
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PASSENGER COMPT FLOOR

AIR SUPPLY

TANK 6

FLOWMETERS



CMB 21 25 00 5 AAMO

Flow Test - Schematic
Figure 502

CAUTION: DO NOT DAMAGE THE PANEL SEALING STRIPS

(4) Remove the grilles and non-return valves from each vapour seal air supply. Connect an air supply to the intake ducts.

RB (5) Disconnect the vent and drain pipes from the skin fittings.

TANKS	ACCESS PANEL IDENT.
8, 9 and 10	231 AF 231 DF 231 GF 131 WS 232 EF
6	233 FF 233 JF 233 GF
11	243 HA 243 LA 153 FB

Vapour Seal - Access Panels
Table 501

B. Test

(1) Turn on the air supply and gradually increase the air pressure to 4 in WG (10 mb).

RB (2) Ensure that there is an airflow at each vapour seal
RB outlet.

(3) Disconnect in turn each pipe union at the underfloor outlets from the vapour seals, and ascertain that there is an air flow at each point. Reconnect each pipe union in turn.

NOTE: This check is to ascertain that an airflow is available at all parts of the system.

C. Conclusion

(1) Turn off the air supply, and disconnect the air supply rig from the inlet of the vapour seal. Fit the grilles and non-return valves.

(2) Fit the floor panels and the furnishing panels in the baggage compartments. Secure them with countersunk bolts, and torque load each bolt to between 20 and 25 lbf in (0.22 and 0.28 mdaN), and fit the floor covering over the panels.

RB (3) Re-connect the drain and vent pipes to the skin fittings.

(4) Close the main landing gear doors as detailed in 32-00-00.

4. Flow Test, Tank 11 Vapour Seals (Ref. Fig.502)

A. Prepare to Test

(1) Remove access panels 243HA and 243LA in the rear baggage compartment roof. Remove the flexible duct connection from the vapour seal air supply duct and connect the air supply rig.

CAUTION: THE REAR BAGGAGE COMPARTMENT DOOR MUST BE CLOSED TO REMOVE PANEL 243LA. A WARNING MUST BE DISPLAYED OUTSIDE THE DOOR TO THE EFFECT THAT THE DOOR SHOULD NOT BE OPENED.

(2) Remove access panel 153FB below the forward bulkhead of tank No.11.

(3) Disconnect the two drain pipes from the restrictor
RB assemblies.

B. Test

(1) Turn on the air supply and gradually increase the air pressure to 4 in WG (10 mb).

RB (2) Ensue that there is an airflow at each vapour seal outlet.

C. Conclusion

(1) Turn off and disconnect the air supply rig and refit the flexible duct to the vapour seal supply connection.

RB (2) Re-connect the two drain pipes to their restrictors.

(3) Replace access panels 243 HA, 243 LA and 153 FB.

5. Leak Test, Tanks, 8, 9, 10 and 6 Vapour Seals (Ref. Fig.503)

A. Prepare to Test

(1) Open the main landing gear doors as detailed in 32-00-00.

(2) Remove the appropriate floor panels to gain access to the air supply inlets of the vapour seals (Ref.Para 3A).

(3) Remove the grille from vapour seal air supply inlet, and remove the non-return valves.

RB (4) Fit an adaptor blank connected to a water manometer to
RB each of the vapour seal intakes and to the forward vent
RB of tank 9.

RB (5) Disconnect the vent and drain pipes from the skin
RB fittings at Tanks 8 & 9, and connect a negative pressure
RB rig to both vents via a T-junction and an isolation valve.

B. Test

NOTE: If these tests are not satisfactorily completed, the
RB systems must be pressure tested (Ref. para 7) and tests repeated until satisfactory.

(1) Turn on the rig to obtain a negative pressure, within the vapour seal, of 4 in WG (10 mb) reading on the manometer, then close the isolating valves.

(2) Check that the time taken for the pressure to change from 3.6 in WG to 0.8 in WG (9 mb to 2 mb) is 50 seconds or greater.

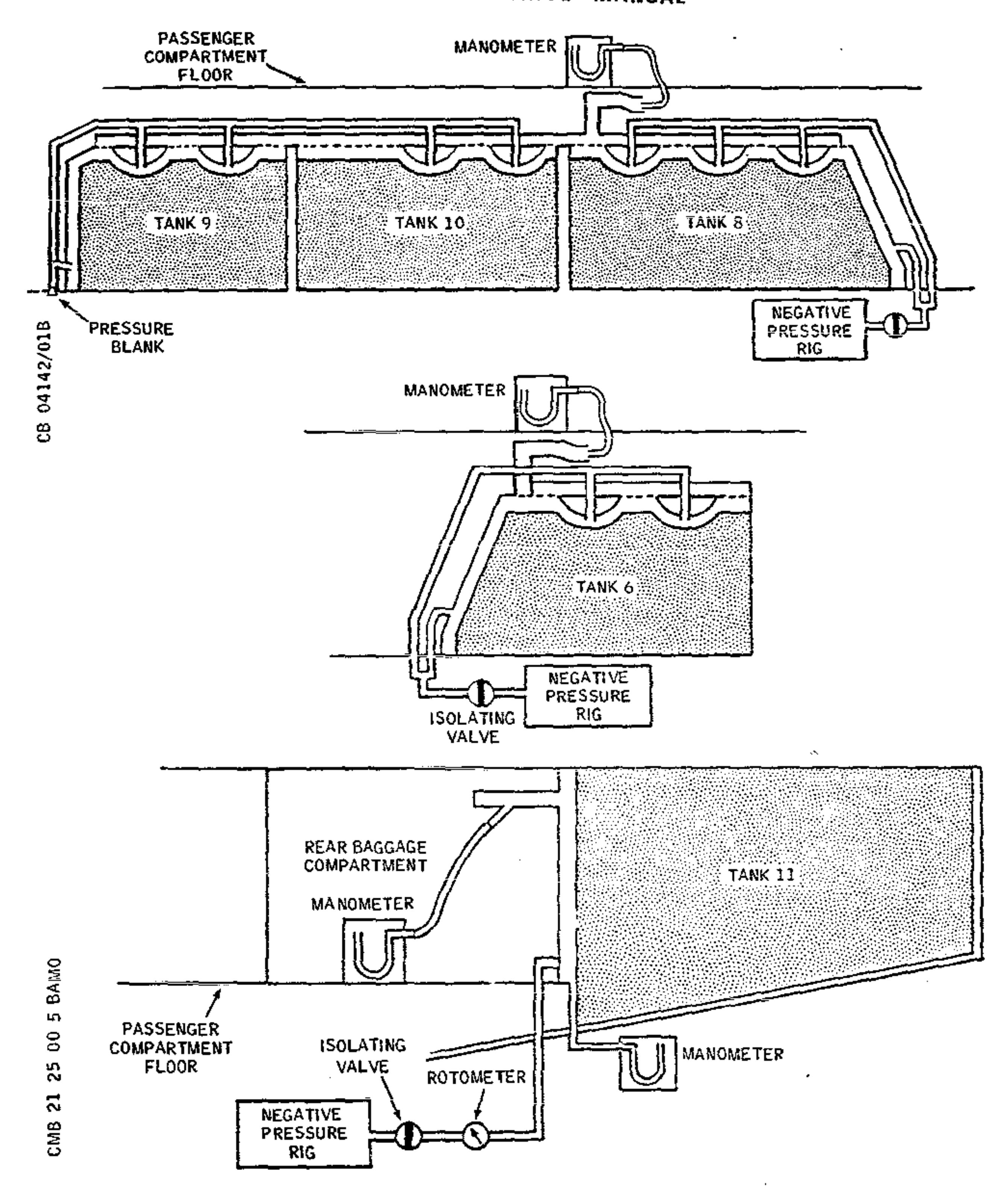
C. Conclusion

(1) Turn off the rigs and allow the negative pressure to decay. Disconnect the rigs.

(2) Disconnect the manometers, remove the adapter blanks and static pressure tappings. Remove blanks from tank 9 vapour seal vent.

(3) Fit the grilles and non-return valves to the inlets to the vapour seals.

(4) Remove the negative pressure rig and isolation valve.



Leak Test - Schematic
Figure 503

and reconnect the vent and drain pipes.

(5) Fit the floor panels and secure them with countersunk bolts. Torque load each bolt to between 20 and 25 lbf in (0.22 and 0.28 mdaN), and fit the floor covering over the panels.

(6) Close the main landing gear doors as detailed in 32-00-00.

6. Leak Test, Tank 11 (Ref. Fig. 503)

A. Prepare to Test

R (1) Remove access panels 243HA and 243LA in the rear
R baggage compartment roof. Remove the flexible duct
R connection from the vapour seal air supply duct and
R connect a water manometer.

R CAUTION: THE REAR BAGGAGE COMPARTMENT DOOR MUST BE
R CLOSED TO REMOVE PANEL 243LA A WARNING
R MUST BE DISPLAYED OUTSIDE THE DOOR TO THE
R EFFECT THAT THE DOOR SHOULD NOT BE OPENED.

(2) Remove access panel 153FB below the forward bulkhead of tank 11.

(3) Disconnect the two vapour seal drain pipes from the restrictor assemblies and connect a negative pressure rig with a flowmeter and isolating valve to the left hand pipe.

(4) Fit an adapter and water manometer to the right hand pipe.

B. Test

(1) Run the rig and gradually open the isolating valve to obtain a negative pressure of 4 in WG (10 mb) at each of the two pressure tappings.

(2) Record the flow rate required to maintain a constant depression of 4 in WG (10 mb) and check that this does not exceed 0.257 lb/min (0.116 kg/min).

C. Conclusion

(1) Turn off the rig and disconnect the test equipment.

R (2) Refit the flexible duct to the vapour seal supply
R connection.

(3) Reconnect the two drain pipes to their restrictor assemblies.

R (4) Replace access panels 243HA,243LA and 153FB.

7. <u>Pressure Test, Tanks 8, 9, 10 and 6, Vapour Seals</u> (Ref. Fig. 504)

A. Prepare to Test

(1) Open the main landing gear doors as detailed in 32-00-00.

(2) Remove the floor panels to gain access to the air supply inlets of the vapour seals (Ref. para 3A).

(3) Remove the grille and non-return valves from each vapour seal air supply duct and connect a pressure rig and water manometer.

(4) Fit blank plugs to the vents and drains of the vapour seals.

B. Test

(1) Turn on the pressure rig and gradually increase the pressure to 3 in WG (7.5 mb) maximum. Maintain the pressure during the test.

(2) Remove the floor panels as required, and remove or move aside the insulation blankets covering the parts of the vapour seal membrane to be checked.

<u>CAUTION:</u> CARE MUST BE TAKEN TO ENSURE THAT THE INSULATION BLANKETS ARE NOT CRUSHED OR DAMAGED.

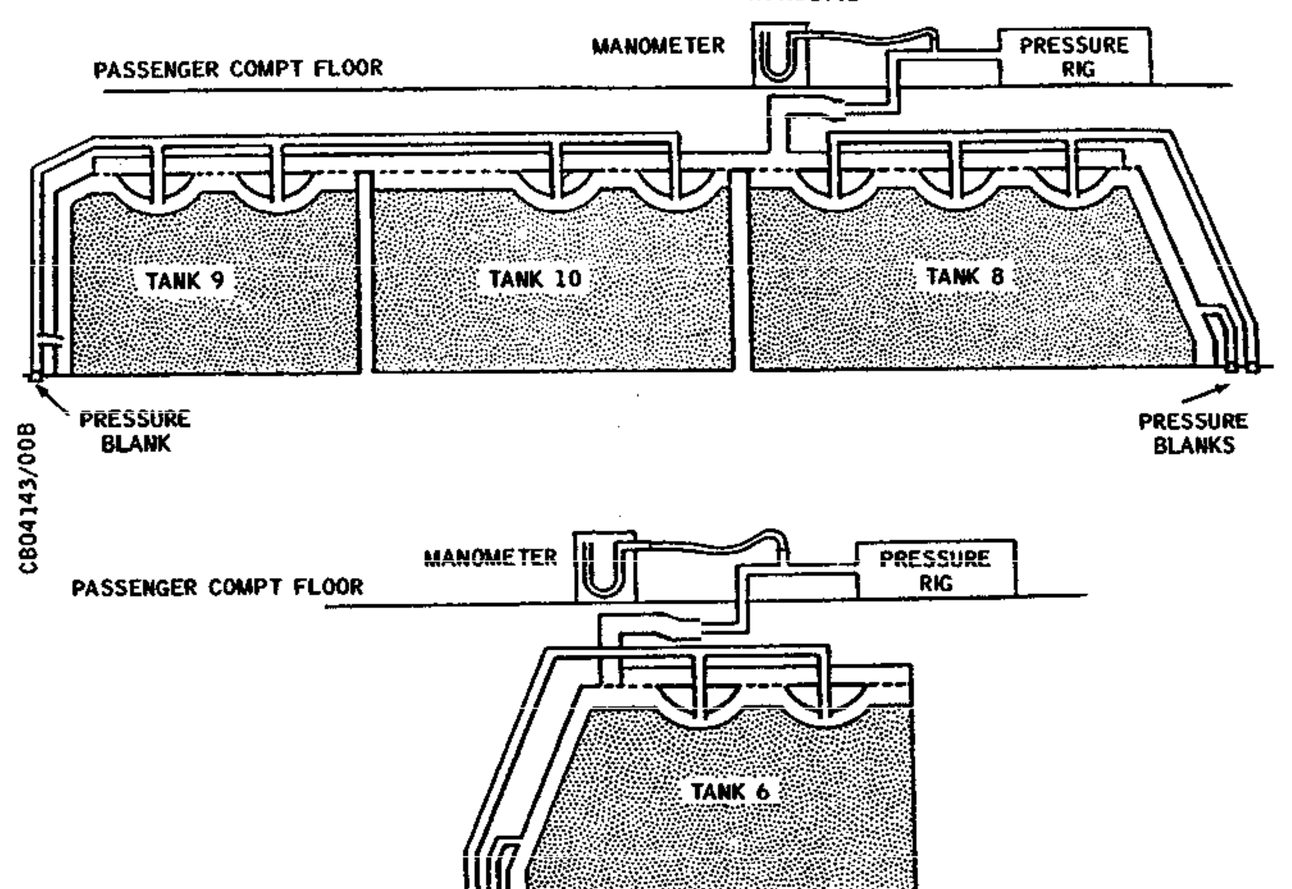
(3) Apply a castile soap and water solution to the vapour seal membrane. Check for air leaks.

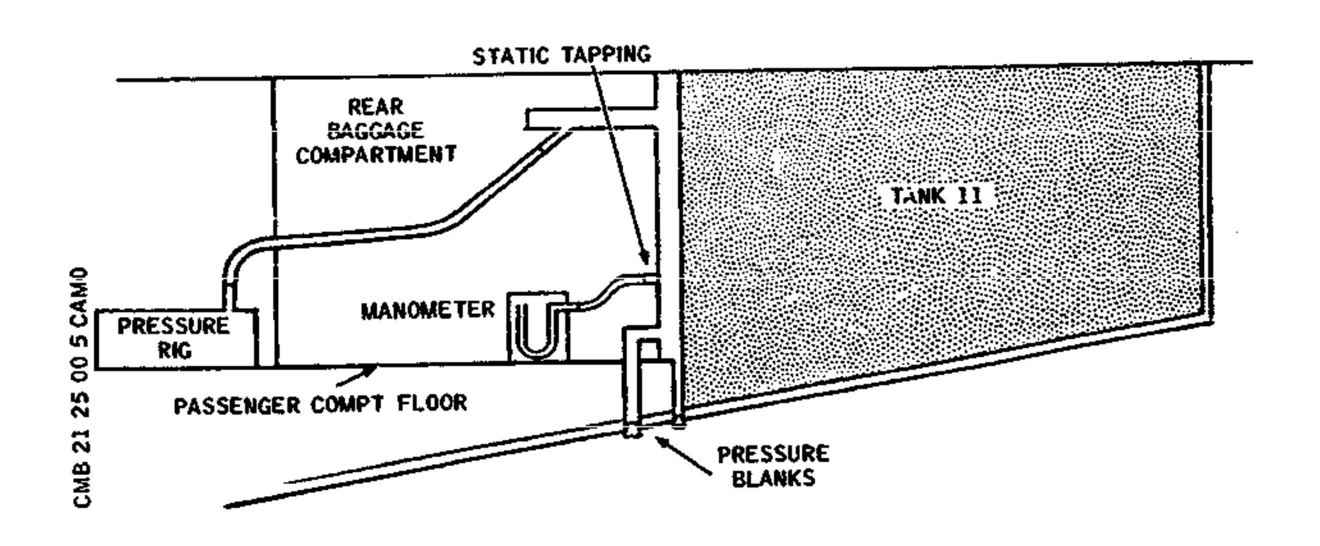
(4) Seal any leaks found (Ref. 21-25-00, Approved Repairs).

(5) Perform a leak test (Ref. para. 5).

C. Conclusion

(1) Turn off the pressure rig, and gradually release





Pressure Test - Schematic
Figure 504

the pressure. Disconnect the rig and manometer.

(2) Remove the blank plugs fitted to the vents and drains.

(3) Fit the grilles and non-return valves to the vapour seal air supply inlets.

(4) Fit the floor panels and secure them with countersunk bolts. Torque load each bolt to between 20 and 25 lbf in (0.22 and 0.28 mdaN), and fit the floor covering over the panels.

(5) Close the main landing gear doors as detailed in 32-00-00.

8. Pressure Test, Tank 11 (Ref. Fig. 504)

A. Prepare to test

(1) Remove access panels 243 HA and 243 LA in the rear baggage compartment roof. Remove the flexible duct connection from the vapour seal air supply duct and connect the pressure rig.

CAUTION: THE REAR BAGGAGE COMPARTMENT DOOR MUST BE CLOSED TO REMOVE PANEL 243 LA. A WARNING MUST BE DISPLAYED OUTSIDE THE DOOR TO THE EFFECT THAT THE DOOR SHOULD NOT BE OPENED.

(2) Remove the rear bulkhead furnishing panels and connect a water manometer to the static tapping.

(3) Open access panel 153 FB, disconnect the two vapour seal drain pipes from the restrictor assemblies and fit blank plugs.

B. Test

(1) Turn on the pressure rig and gradually increase the pressure to 3 in WG (7.5 mb). Maintain the pressure during the test.

(2) Move the insulating blankets aside as required to reach the bulkhead vapour seal.

CAUTION: CARE MUST BE TAKEN TO ENSURE THAT THE INSULATION BLANKETS ARE NOT CRUSHED OR DAMAGED.

(3) Apply a castile soap and water solution to the vapour seal membrane. Check for air leaks.

(4) Seal any leaks found (Ref. 21-25-00, Approved Repairs).

(5) Perform leak test (Ref. para. 6).

C. Conclusion

R (1) Turn off the pressure rig and disconnect. Refit
R the flexible duct to the vapour seal supply
R connection.

(2) Remove the manometer and recap the static pressure connection.

(3) Replace the insulation material and refit the upper baggage compartment bulkhead furnishing panels.

(4) Remove the blank plugs from the vents and reconnect the two pipes to their restrictor assemblies.

R (5) Replace access panels 243HA, 243LA and 153FB.

VAPOUR SEAL/FUEL TANK INTERSPACE VENTILATION - INSPECTION/CHECK

1. General

An inspection is required to assess the rate of any fuel seepage, from fuselage tanks 8, 9, 10 and 6, into the interspace between the tanks and the vapour seals, to avoid the possibility of fuel and/or fuel vapour entering the passenger compartment in the event of the vapour seals being damaged.
The initial check, to establish the inspection requirement, is is performed by using a vacuum rig, attached to the appropriate vapour seal drain, to draw-off any fuel which may have collected on the top surface of the fuel tank as a result of seepage. The fuel thus drawn-off is then measured to establish the seepage rate per hour of the particular fuel tank(s).

2. Inspection for Fuel Seepage (Ref. Fig.601 and 602)

CAUTION: THE AIRCRAFT MAY BE JACKED UP FOR OTHER MAINTENANCE PURPOSES PRIOR TO THE THREE HOUR WAITING PERIOD (REF. PARA. 2B), PROVIDED THAT THE WEIGHT AND C.G. LIMITS ARE NOT EXCEEDED (REF. 7-11-00).

NOTE: The vacuum rig is to be connected to each vapour seal vent in turn, to establish the seepage rate from each tank(s). When carrying out the inspection initially, and the integrity of the rig is to be proved, use the initial rig as shown (Ref. Fig. 602). Subsequently, if the same, or an identical, vacuum rig is used the simplified checks using rig A or B may be adopted.

A. Equipment and Materials

DESCRIPTION	PART NO.
Adapter (Ref. Fig. 602)	-
Fuel separator (Ref. Fig. 601)	-
Vacuum rig (To reduce pressure by at least 10.5 in Hg (350 mb) with a minimum flow rate of 10 gr/sec. (Ref. Fig. 602)	-
Flowmeter (To measure air flow up to 20 gm/sec)	-
Two mercury manometers	

DESCRIPTION	PART NO.
(Or other pressure measuring devices), range - 0 to 15 in Hg (0 to 500 mb).	-
Seal	BAS 9059-4

B. Preparation

(1) Fully refuel tanks 6, 8, 9 and 10 (Ref. 12-11-22) and note the precise time at which the tanks were filled. Allow the tanks to remain in this condition for at least 3 hours.

(2) Fit the threaded adapter, together with the seal, to the appropriate tank vapour seal vent on the bottom of the fuselage (Ref. Fig. 602).

(3) Connect the appropriate rig to the adapter (see Note and Fig. 602).

C. Inspect (Ref. Fig. 602)

(1) Start up the vacuum rig and adjust the pressure (P1), at the rig inlet to give a reading of approximately 10.5 in Hg (350 mb).

(2) Check the reading on the manometer at the inlet to the fuel separator (P2) and calculate the value of P2 - P1.

(3) Check the operation of the rig:

(a) Initial rig. Observe the reading of the flowmeter and verify that the rig is operating in the SUITABLE zone of the graph (Ref. Fig. 603).

(b) Rig A. Check that the flowmeter reads between 3 and 16 gm/sec.

(c) Rig B. Check that the difference between the two manometer readings is between 0.3 and 4.8 in Hg (10 to 160 mb).

(4) Observe the fuel level in the fuel separator sight glass. If there is no sign of fuel after 5 minutes,

stop the rig. If fuel is present, allow the rig to operate until the level ceases to rise, then after a further 5 minutes, stop the rig.

(5) Calculate the fuel seepage rate for each tank:

NOTE: This check may be carried out with one tank full at a time, which will assist in identifying the seeping tank.

$$\text{Seepage rate (cc/hr)} = \frac{\text{Fuel accumulated in separator}}{\text{Time since fitting tank}}$$

(6) Note the fuel seepage rate for each tank:

(a) If the seepage rate is less than 6 cc/hr, take no further action.

(b) If the seepage rate is between 6 and 180 cc/hr, carry out the inspection procedure detailed in para. 3, less operations D. (3) and (4).

(c) If the seepage rate exceeds 180 cc/hr, carry out the entire inspection procedure in para. 3.

C. Conclusion

(1) Disconnect the vacuum equipment from the aircraft and remove the threaded adapter from the aircraft vent.

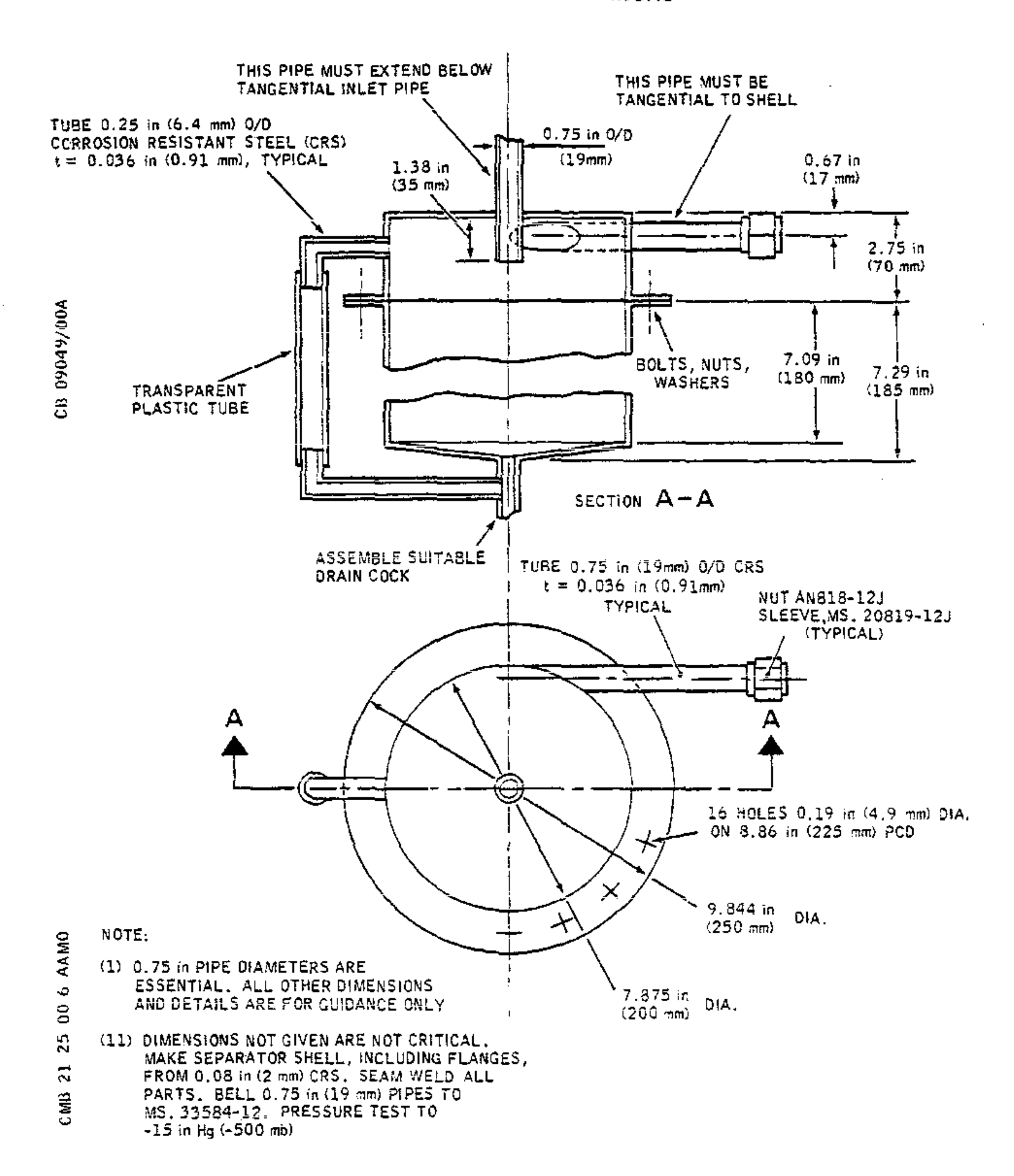
3. Inspection Following Perceived Fuel Seepage

A. General

This inspection is required when the degree of fuel seepage from tanks 8, 9, 10 and 6, into the vapour seal areas, exceeds 6 cc/hr, as determined in para. 2.

B. Equipment and Materials

DESCRIPTION	PART NO.
Solvent, cleaning, Freon 113 (Ref. 20-30-00, No.491)	-
R 'Kimwipe' tissues	-



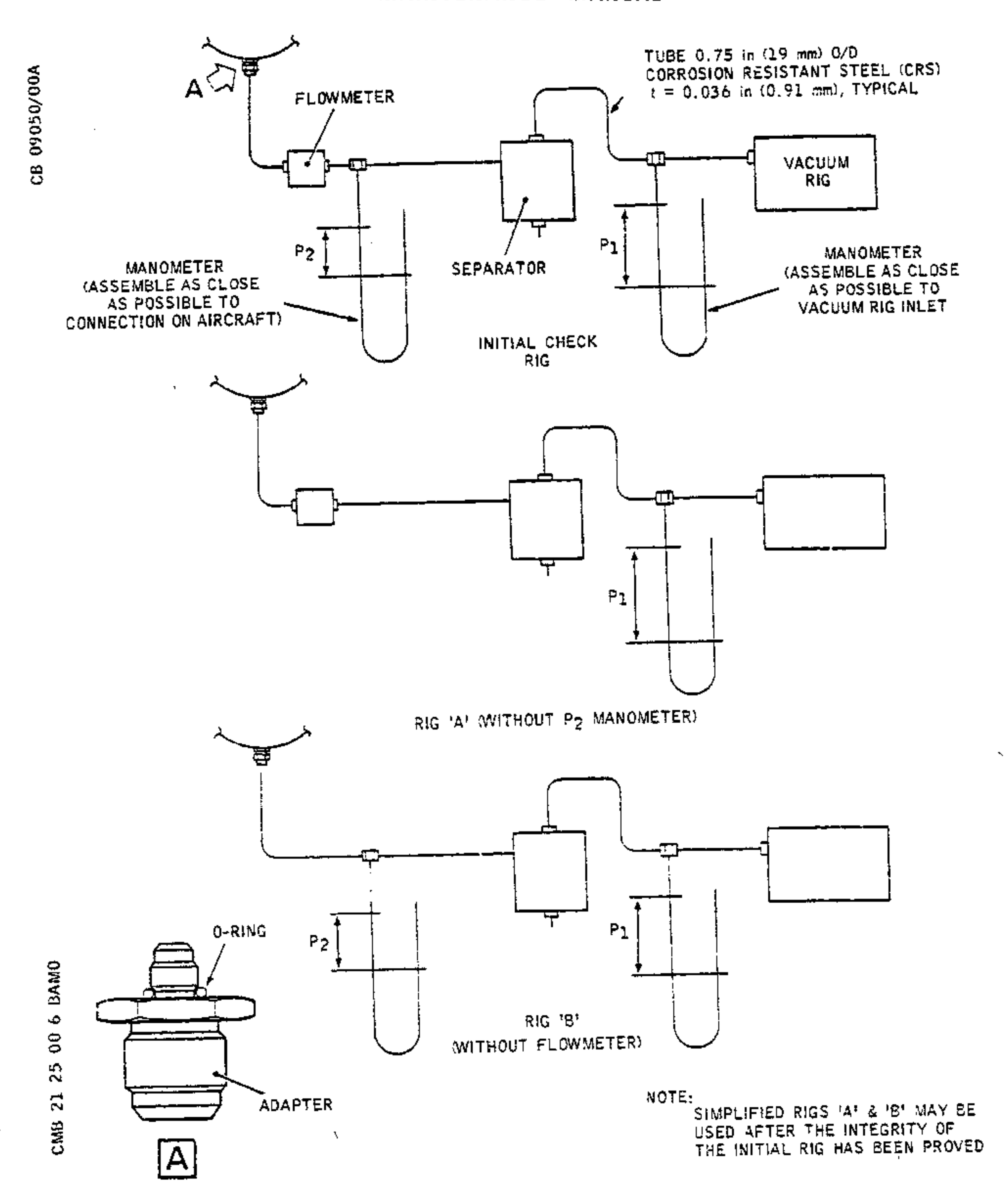
NOTE:

(1) 0.75 in PIPE DIAMETERS ARE ESSENTIAL. ALL OTHER DIMENSIONS AND DETAILS ARE FOR GUIDANCE ONLY

(11) DIMENSIONS NOT GIVEN ARE NOT CRITICAL. MAKE SEPARATOR SHELL, INCLUDING FLANGES, FROM 0.08 in (2 mm) CRS. SEAM WELD ALL PARTS. BELL 0.75 in (19 mm) PIPES TO MS. 33584-12. PRESSURE TEST TO -15 in Hg (-500 mb)

R

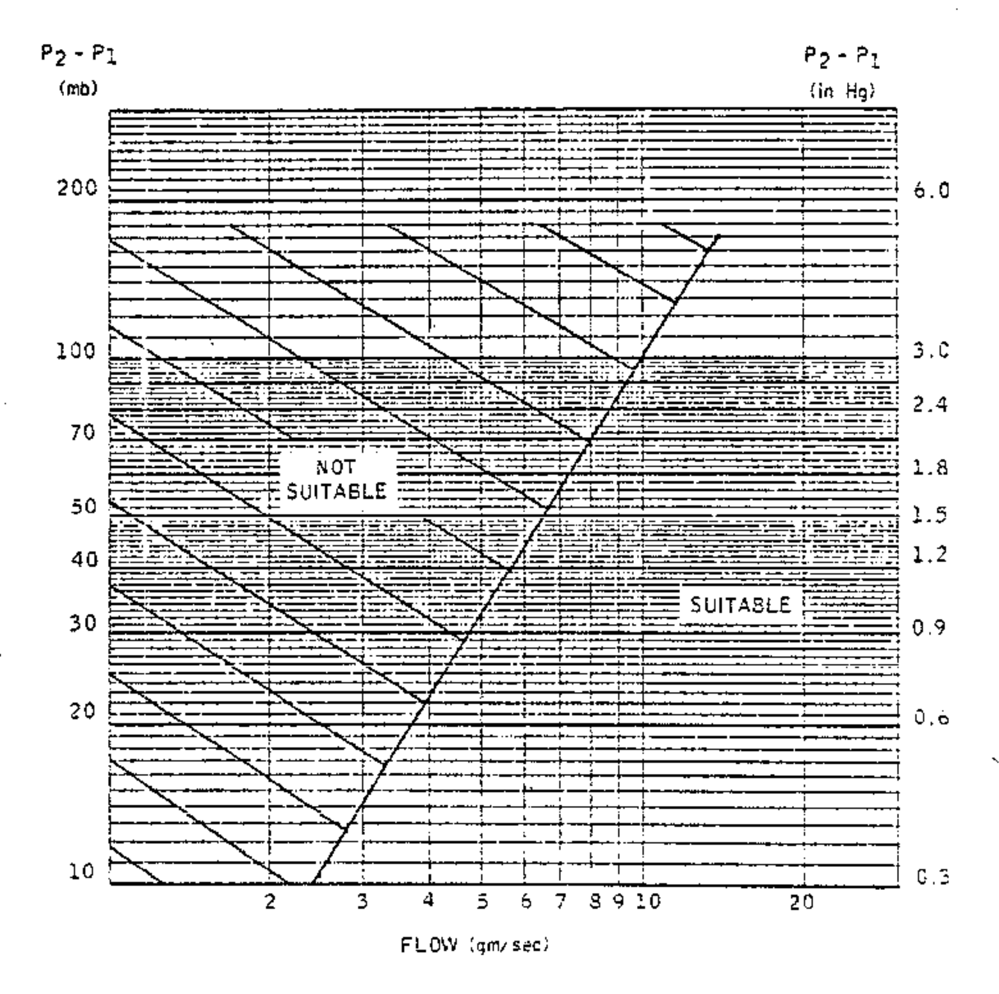
Fuel Separator
Figure 601



R

Vacuum Rig
Figure 602

CB 09051/00B



CMB 21 25 00 6 CAMO

Rig Proving Graph
Figure 603

R

C. Prepare to Inspect

(1) Remove the centre aisle floor coverings in the area of the fuselage fuel tank vapour seals (Ref. 25-21-25, Removal/Installation).

(2) Remove the passenger compartment floor panels (Ref. 53-21-21, Removal/Installation):

TANK NO.	FLOOR PANEL IDENT
6	233 FF, 233 JF.
8	231 DF, 231 GF.
9	223 SF
10	231 AF

D. Inspection

(1) Visually examine the insulation blankets, above the fuel tank vapour seals, for signs of fuel contamination (Ref. 25-00-11, Inspection/Check). Remove any contaminated blankets for replacement and/or repair (Ref. 25-00-11, Approved Repairs), and remove blankets as necessary to gain access to the vapour seal.

(2) Clean and dry the adjacent areas of the vapour seal membrane, using lint-free cloth or tissues and solvent. Inspect the vapour seal membrane for damage and, if necessary, repair it in accordance with 21-25-00, Approved Repairs.

(3) Open the vapour seal zip-fasteners and mop-up with lint-free cloth or tissues, any fuel on the top surface of the fuel tank. Inspect the surface and determine the location of seepage points. Repair, where necessary, in accordance with 28-11-00, Approved Repairs.

NOTE: Thoroughly dry the area using a dry air blast. Clean the surface with solvent to remove fuel vapour contamination.

(4) Ensure that the top surface of the fuel tank roof is free from debris and equipment, and close the vapour seal zip-fasteners.

(5) Ensure that the vapour seal air inlet pipe non-return valves and grilles are clean and unobstructed, and that the non-return valve flaps in the fuselage skin are unobstructed.

(6) Refit the insulation blankets, including new and/or repaired blankets.

C. Conclusion

(1) Install the floor panels (Ref. 53-21-21, Removal/ Installation).

(2) Refit the floor covering (Ref. 25-21-25, Removal/ Installation).

VAPOUR SEAL/FUEL TANK INTERSPACE VENTILATION - APPROVED REPAIRS

1. General

Fuel tank vapour seal membranes, made from a viton coated fabric, form a ventilated airspace between fuel tanks 6, 8, 9, 10 and 11 and the passenger compartment in the aircraft. Slits in the membranes, providing access to tank surfaces and ventilation components, are secured closed by zip fasteners.

Tears and punctures in the membranes are permanently repaired in situ, using patches of viton proofed Nomex fabric and adhesive. Temporary or permanent repairs may be performed on the membrane. The same adhesives are used to re-attach the zip fasteners to Membranes (Ref. para. 4 and 5).

2. Vapour Seal Membrane Repair Using Adhesive EC 1099 (Ref. Fig. 801)

A. Equipment and Materials

DESCRIPTION	PART NO.
Viton proofed Nomex fabric (Ref.20-30-00, No. 160)	-
RB Terylene Neoprene fabric RB (alternative to Viton proofed Nomex)	TN009-5
Adhesive EC 1099 (Ref.20-30-00, No.312)	
Solvent Methylethylketone (Ref. 20-30-00, No.470)	-
Fine brush	-
Scraper	-
Scissors	-

B. Prepare

(1) Remove or move aside the insulation blanket covering the section of the membrane to be repaired.

CAUTION: CARE MUST BE TAKEN TO ENSURE THAT THE INSULATION BLANKETS ARE NOT CRUSHED OR DAMAGED.

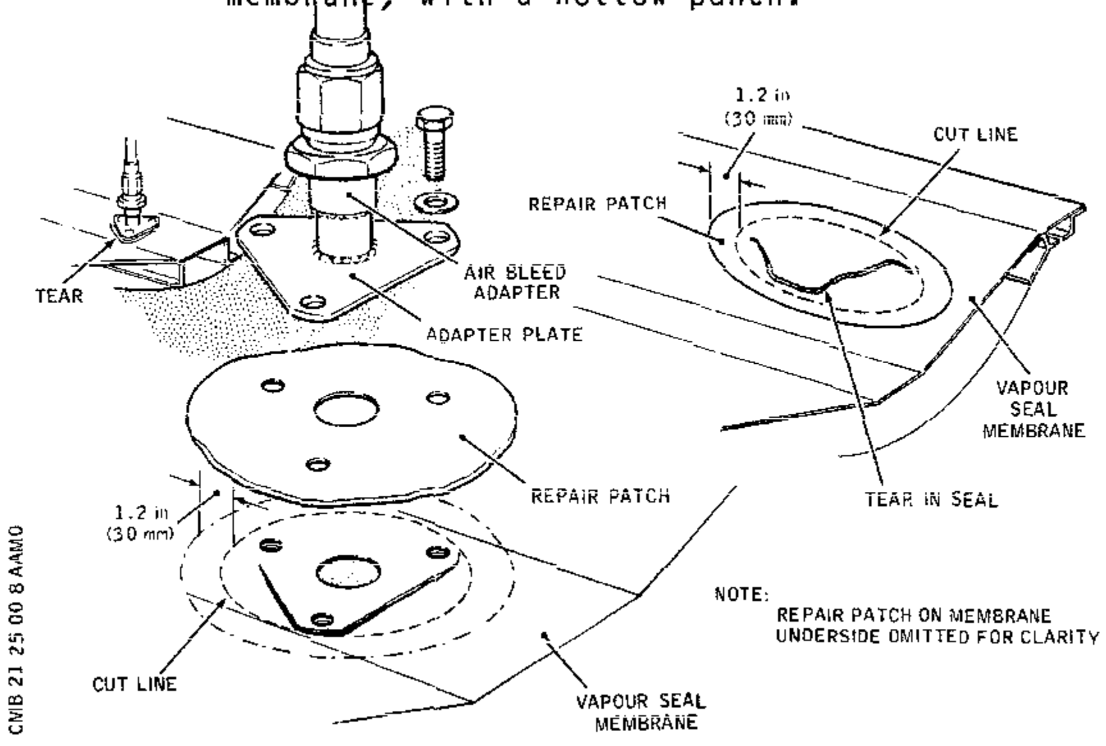
(2) If the damage to the membrane is in the vicinity of an air bleed adapter, disconnect the hose from the adapter, remove the three bolts and washers securing the adapter plate and remove the adapter (Ref. Fig. 801).

C. Repair

WARNING: THE ADHESIVE CONTAINS A VOLATILE AND FLAMMABLE SOLVENT, THEREFORE THE REPAIR AREA MUST BE WELL VENTILATED AND AWAY FROM NAKED LIGHTS.

(1) Mark the area to be repaired on the membrane, to conform with the dimensions shown in (Ref. Fig. 801). Cut a regular hole, without corners, around the tear using scissors; remove excess fabric.

(2) Prepare a viton proofed Nomex fabric patch to cover the marked area. Make any necessary attachment holes in the patch, to align with those in the membrane, with a hollow punch.



Fuel Vapour Seal Membrane - Approved Repairs
Figure 801

(3) Clean the area of the membrane to be covered by the repair patch, and the patch itself, with methylethylketone. Dry the surfaces, and ensure that no traces of grease or oil remain.

R (4) Apply the patch:

NOTE: EC 1099 adhesive must be used in accordance with the instructions contained in 20-25-13.

(a) Spread a thin coat of adhesive over the repair area and the mating surface of the patch and allow to dry for approximately 40 minutes.

(b) Apply a second coat of the adhesive and allow to become dry to the touch (approximately 10 to 15 minutes).

(c) Position the repair patch on the membrane, and press it down firmly to ensure a good contact at all points.

(d) If the edge of the patch does not stick or if the patch has to be peeled off for any reason, the adhesive will be faulty. The patch must then be removed, the adhesive removed from the surfaces, and surface thoroughly cleaned. Re-apply the adhesive and repeat the repair sequence.

(5) Allow the repair to cure for four hours.

(6) Fit the air bleed adapter and its hose, if applicable.

(7) Pressure test the vapour seal as detailed in 21-25-00, Adjustment/Test.

3. Vapour Seal Membrane - Repair Using Superflexit 707 (Ref. Fig. 801)

A. Equipment and Materials

DESCRIPTION	PART NO.
Viton proofed Nomex fabric (Ref.20-30-00, No.160)	-
Adhesive, Superflexit 707 (Ref.	-

DESCRIPTION	PART NO.
20-30-00, No. 329). Life, six months at -20 deg C	
Hardener, Superflexit R (Ref. 20-30-00, No. 330). Life, six months at -20 deg C	-
Solvent Methylethylketone (Ref. 20-30-00, No.470)	-
Fine brush	-
Scraper	-
Scissors	-
Gloves and goggles	-
Fine grade sandpaper	-

B. Prepare

(1) Remove or move aside the insulation blanket covering the section of the membrane to be repaired.

CAUTION: CARE MUST BE TAKEN TO ENSURE THAT THE INSULATION BLANKETS ARE NOT CRUSHED OR DAMAGED.

(2) If the damage to the membrane is in the vicinity of an air bleed adapter, disconnect the hose from the adapter, remove the three bolts and washers securing the adapter plate and remove the adapter (Ref. Fig. 801).

C. Repair

WARNING: THE ADHESIVE CONTAINS A VOLATILE AND FLAMMABLE SOLVENT, THEREFORE THE REPAIR AREA MUST BE WELL VENTILATED AND AWAY FROM NAKED LIGHTS.

KEEP THE HARDENER AND SOLVENT AWAY FROM SKIN, EYES, AND RESPIRATORY TRACTS.

(1) Mark the area to be repaired on the membrane,

to conform with the dimensions shown in (Ref. Fig. 801). Cut a regular hole, without corners, around the tear using scissors; remove excess fabric.

(2) Prepare two viton proofed Nomex fabric patches to cover the marked area. Make any necessary holes in the patches, to align with those in the membrane, with a hollow punch.

(3) Thoroughly mix the hardener and the adhesive in a ratio of five parts hardener to 100 parts of adhesive.

(4) Clean the area of the membrane to be covered by the repair patches, and the patches themselves, with methylethylketone. Lightly abrade the surfaces with fine grade sandpaper. Clean the surfaces with methylethylketone, dry them, and ensure that no traces of grease or oil remain.

CAUTION: ONCE MIXED THE ADHESIVE MAY BE USED DURING A TWO HOUR PERIOD ONLY.

R (5) Apply the two prepared patches:

(a) Spread a thin coat of adhesive over each side of the repair area and on the mating surfaces of each patch. Apply a liberal coat of adhesive around the edge of the repair.

(b) Allow the adhesive to dry for 10 minutes.

(c) Apply a second coat of adhesive over the repair area and the patches.

(d) Allow the adhesive to dry until it is no longer sticky to the touch, then apply the patches, one on each side of the repair area. Press the patches together firmly, working progressively outwards from the centre to remove all air bubbles.

(e) Blend the nearest patch with membrane by applying several coats of adhesive to the edge of the patch and the surrounding area.

NOTE: If the edge of the patch does not stick or if the patch has to be peeled off for any reason, the surfaces must be re-coated with adhesive, as in previous operations, and the repair sequence

repeated.

(6) Allow the repair to cure for 48 hours.

(7) Fit the air bleed adapter and its hose, if applicable.

(8) Pressure test the vapour seal as detailed in 21-25-00, Adjustment/Test.

4. Zip Fastener-to-Vapour Seal Membrane - Bonding Using Adhesive EC 1099

A. Equipment and Materials

DESCRIPTION	PART NO.
Adhesive EC 1099 (Ref. 20-30-00, No. 312)	-
Solvent, Methylethylketone (Ref. 20-30-00, No. 470)	-
Fine brush	-
Scraper	-

B. Prepare

(1) Move aside the insulation blanket covering the detached zip fastener.

CAUTION: CARE MUST BE TAKEN TO ENSURE THAT THE INSULATION BLANKETS ARE NOT CRUSHED OR DAMAGED.

C. Repair

WARNING: THE ADHESIVE CONTAINS A VOLATILE AND FLAMMABLE SOLVENT, THEREFORE THE REPAIR AREA MUST BE WELL VENTILATED AND AWAY FROM NAKED LIGHTS.

(1) Remove all traces of cured adhesive from the vapour seal membrane and from the zip fastener support and clean the two surfaces to be bonded with methylethy-ketone solvent. Dry the surfaces and ensure that no trace of grease or oil remains.

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(2) Bond the fastener to the membrane:

NOTE: EC 1099 adhesive must be used in accordance with the instructions contained in 20-25-13.

(a) Spread a thin coat of adhesive over the two surfaces to be bonded and allow to dry for approximately 40 minutes.

(b) Apply a second coat of the adhesive to both surfaces and allow to become dry to the touch (approximately 10 to 15 minutes).

(c) Position the zip fastener on the membrane and press them together to exclude any air bubbles.

(d) Allow to cure for four hours.

(3) Pressure test the vapour seal as detailed in 21-25-00, Adjustment/Test.

5. Zip Fastener-to-Vapour Seal Membrane - Bonding Using Adhesive Superflexit 707

A. Equipment and Materials

DESCRIPTION	PART NO.
Adhesive, Superflexit 707 (Ref. 20-30-00, No. 329)	-
Hardener, Superflexit R (Ref. 20-30-00, No.330)	-
Solvent, Methylethylketone (Ref. 20-30-00, No. 470)	-
Fine Brush	
Scraper	-
Gloves and goggles	-
Fine grade sandpaper	-

B. Prepare

(1) Move aside the insulation blanket covering the detached zip fastener.

CAUTION: CARE MUST BE TAKEN TO ENSURE THAT THE INSULATION BLANKETS ARE NOT CRUSHED OR DAMAGED.

C. Repair

WARNING: THE ADHESIVE CONTAINS A VOLATILE AND FLAMMABLE SOLVENT, THEREFORE THE REPAIR AREA MUST BE WELL VENTILATED AND AWAY FROM NAKED LIGHTS.

KEEP THE HARDENER AND SOLVENT AWAY FROM SKIN, EYES AND RESPIRATORY TRACTS.

(1) Remove all traces of cured adhesive from the vapour seal membrane and from the zip fastener support and clean the two surfaces to be bonded with methylethyl-ketone solvent. Lightly abrade both surfaces with fine grade sandpaper. Clean both surfaces with the solvent, dry the surfaces and ensure that no trace of grease or oil remains.

CAUTION: ONCE MIXED THE ADHESIVE MAY BE USED DURING A TWO HOUR PERIOD ONLY.

(2) Thoroughly mix the hardener and the adhesive in a ratio of five parts hardener to 100 parts adhesive.

(3) Bond the fasteners to the membrane:

(a) Apply a thin coat of adhesive to the surfaces to be bonded.

(b) Allow to dry for 10 minutes

(c) Apply a second coat of adhesive to the surfaces to be bonded.

(d) Allow the adhesive to dry until it is no longer sticky to the touch, the position the fastener on the membrane and press them together to include any air bubbles.

(e) Blend out the edges of the zip fastener by applying several coats of adhesive to the edges and surrounding area of the vapour seal membrane.

(f) Allow to cure for 48 hours.

R (4) Pressure test the vapour seal as detailed in
R 21-25-00, Adjustment/Test.

NON - RETURN VALVES - REMOVAL/INSTALLATION

1. General

Three non-return valves are fitted in the system air ducts. Two identical flap-type valves are located below floor and above No. 6 and 8 fuel tanks at the end of air ducts; the other (sphincter-type) valve, is located at the end of an air duct where it joins the vapour seal on the forward bulkhead of No. 11 tank.

2. Non-return Valve (Flap-type)

A. Equipment and Materials

DESCRIPTION	PART NO.
Torque screwdriver	NAS 1079
Negative air pressure rig capable of 4 in WG (10 mb)	-

B. Prepare to Remove

(1) Remove the floor covering to expose floor panels 232 EF (Ño.8 tank) and 233 GF (No.6 tank).

(2) Remove and retain the countersunk bolts from the floor panel.

(3) Locate the lifting tapes at the edge of the panel, and pull them to raise the panel from its recess. Remove the panel.

CAUTION: DO NOT DAMAGE THE PANEL SEALING STRIPS.

C. Remove

(1) Remove the three screws and washers securing the grille to the duct; remove the grille.

(2) Withdraw the housing, complete with the valve plate from the duct. Fit a suitable blank cover to the duct aperture.

D. Prepare to Install

(1) Check the valve seat:

(a) Check that the valve plate can move freely on its hinge.

(b) Cover the screwed holes in the housing, then apply a negative air pressure of 4in WG(10mb) to the open end of the housing. Check that there is no leakage past the valve plate.

(c) Uncover the screwed holes in the housing.

(d) Disconnect the pressure rig.

E. Install

(1) Remove the blank cover fitted to the duct, and ensure that the duct is clear of debris.

(2) Insert the valve into the duct, with the valve plate foremost, so that the groove on the housing engages the detent in the duct. Push the valve into the duct until the screw holes are aligned.

(3) Fit the grille over the end of the duct so that the slots align with the screw holes; secure it with three washers and screws.

(4) Leak-test the pipe system (Ref. 21-25-00, Adjustment/Test).

(5) Fit the floor panels and secure them with countersunk bolts. Torque load each bolt to between 20 and 25 lbf in (0.22 and 0.28 mdaN).

(6) Refit the floor covering.

3. Non-return Valve (Sphincter-type)

A. Equipment and Materials

DESCRIPTION	PART NO.
Negative air pressure rig capable of 4 in WG (10 mb)	-
Non-corrodible steel binding wire 0.028 in (0.7 mm)	-

B. Prepare to Remove

(1) Gain entry to the rear baggage compartment.

(2) Remove the roof panel immediately forward of No. 11 tank bulkhead.

C. Remove

(1) Undo the clip securing each flexible duct to each stub duct. Disconnect the flexible ducts from the duct.

(2) Undo the clips at each end of the length of duct immediately forward of the bulkhead.

(3) At each end of the duct, roll the sleeve clear of the joint; remove the duct. Fit blank covers to the duct apertures and to the bulkhead vapour seal.

(4) Remove the binding wire securing the non-return valve to the duct; remove the valve.

D. Prepare to Install

(1) Check the valve:

(a) Check that the valve is undamaged and that the flexible sides of the valve can be opened freely.

(b) Apply a negative air pressure of 4 in WG (10mb) to the circular end of the valve and check that there is no leakage through the valve.

(c) Disconnect the pressure rig.

E. Install

(1) Push the non-return valve on to the shortest, straight end of the duct so that with the valve lips in line with the branch ducts, it engages the duct by at least 0.7 in (18 mm); secure the valve with ten complete turns of binding wire.

<u>NOTE:</u> Each turn of wire must contact the valve and the adjoining turn; secure the wire by twisting the ends together at least four complete turns.

<u>CAUTION:</u> DO NOT OVER-TENSION THE WIRE.

(2) Remove the blank covers from the duct apertures and from the vapour seal, and ensure that the ducts are clear of debris.

(3) Position the duct so that the valve enters the vapour seal aperture, and the other end of the duct aligns with the duct system; ensure that the gap between the two ducts is between 0.1 in (2.54 mm) and 0.3 in (7.6 mm). At each end of the duct, roll the sleeve over the joint so that it covers the duct bead and provides a landing for the securing clip; fit the clips.

(4) Engage the two flexible ducts with the stub ducts; secure them with clips,

(5) Leak test the duct to the bulkhead vapour seal (Ref. 21-25-00, Adjustment/Test).

(6) Refit the roof panel.

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NON-RETURN VALVES - INSPECTION/CHECK

1. General

Three non-return valves are fitted at the fuel tank vapour seal air intakes. Two identical flap type valves are located below the passenger compartment floor and above No.6 and 8 fuel tanks at the ends of the air ducts. The other (sphincter type) valve is located at the end of the duct supplying the vapour seal at the forward bulkhead of No.11 tank. This valve is inside the vapour seal and cannot be inspected without removal.

2. Non-return Valve (Flap-type)

A. Equipment and Materials

DESCRIPTION	PART NO.
Torque screwdriver	NAS 1079

B. Prepare to Inspect

(1) Remove floor covering and floor panels 232 EF (No.8 tank) and 233 GF (No.6 tank) (Ref. 21-25-21, Removal/Installation).

C. Inspect

(1) Check that the wire mesh grille is clean and clear and free from damage.

(2) Insert a suitable probe through the grille and check that the valve plate moves freely on its hinge and returns to the shut position by gravity.

D. Conclusion

(1) Refit floor panels and floor covering (Ref. 21-25-21, Removal/Installation).

3. Non-return Valve (Sphincter-type)

A. Equipment and Materials

DESCRIPTION	PART NO.
Negative air pressuring capable of 4 in WG (10 mb)	

B. Prepare to Inspect

(1) Remove the branch duct with sphincter valve attached (Ref. 21-25-21, Removal/Installation).

C. Inspect

(1) Check that the valve is clean and undamaged and that the flexible lips of the valve open and close freely.

(2) Apply a negative air pressure of 4 in WG (10 mb) to the branch duct and check that there is no leakage through the valve.

D. Conclusion

(1) Refit the valve and branch duct (Ref. 21-25-21, Removal/Installation).

REAR EQUIPMENT COMPARTMENT - PURGING - DESCRIPTION AND OPERATION

1. General (Ref. Fig.001 and 002)

The rear equipment compartment is purged of fuel and hydraulic fluid vapour by air discharged from the passenger compartment. When this flow fails, because of a low pressure differential, a fan replaces it with air from outside the aircraft. Air from the compartment is discharged overboard.

The system comprises a main duct with open-ended branch pipes strategically directed about the compartment to achieve effective purging. A fan is controlled by a pressure switch to supply external air to the main duct when the aircraft is on the ground or at a low altitude.

At the intake, a spring-loaded non-return valve closes the orifice when the fan is not in use.

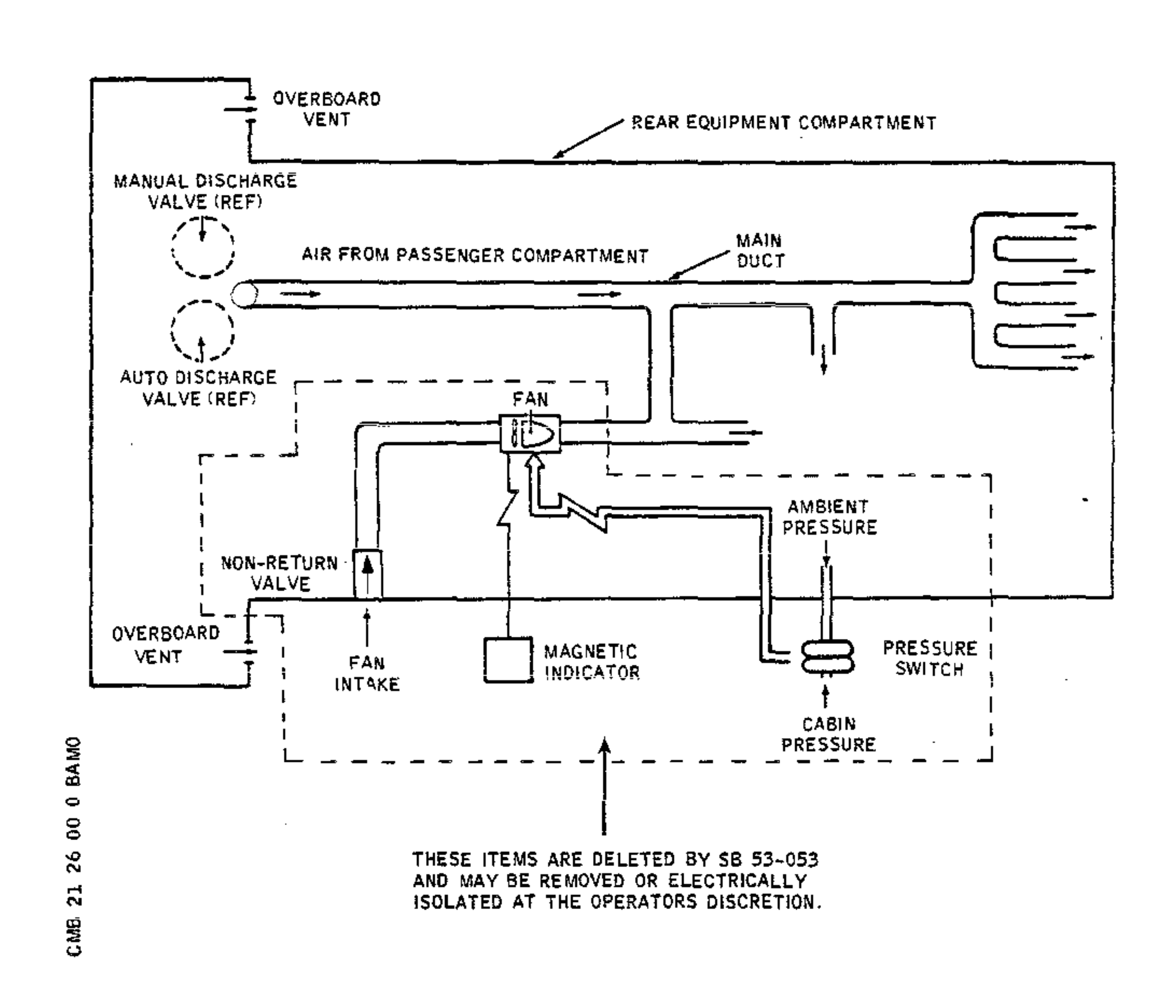
Air discharged from the passenger compartment supplies the system when the pressure differential between the passenger compartment and the rear equipment compartment exceeds the pressure switch setting during flight. The air from the rear equipment compartment is exhausted overboard through two vents.

The electrical supply for the fan is obtained from the main 115 V a.c. busbar. The supply to the pressure switch and the HYD BAY FAN magnetic indicator on the EQUIPMENT BAY COOLING section of panel 2-214, at the third crew member's station, is obtained from the main 28V d.c. busbar.

R
R After SB 53-053
R The rear equipment compartment is purged of fuel and hydraulic
R fluid vapour by air discharged from the passenger compartment.
R Air from the compartment is discharged overboard through
R two ventilation outlets.
R
R The system comprises a main duct with open - ended branch
R pipes strategically directed about the compartment to achieve
R effective purging.
R
R If the equipment deleted by SB 53-053 is removed from the
R aircraft, the duct will be supported and blanked off.
R
R Before SB 53-053

2. Fan (Ref. Fig. 003)

An axial-flow fan is mounted beneath the pressure floor in zone L153 to induce air into the equipment compartment. The a.c. motor and impeller are mounted in a cylindrical case which has flanged ends recessed to take O-ring seals. The flanges match those of the associated duct couplings.



- Rear Equipment Compartment Purging System -
Schematic Diagram.
Figure 001

R

A fan ON, OFF magnetic indicator is controlled by a phonic wheel detector operating at 8000 rpm.

Electrical connections to the motor and to the internal centrifugal switches are made via a receptacle on the case. A small plate on the case indicates the direction of airflow through the fan.

3. Non-return Valve (NRV)

A spring-loaded, flap type NRV is fitted at the entry to the fan inlet duct. It lies flush with the outer surface of the fuselage skin when closed and opens inward when the fan lowers the pressure in the inlet duct to a value below the ambient pressure.

4. Pressure Switch

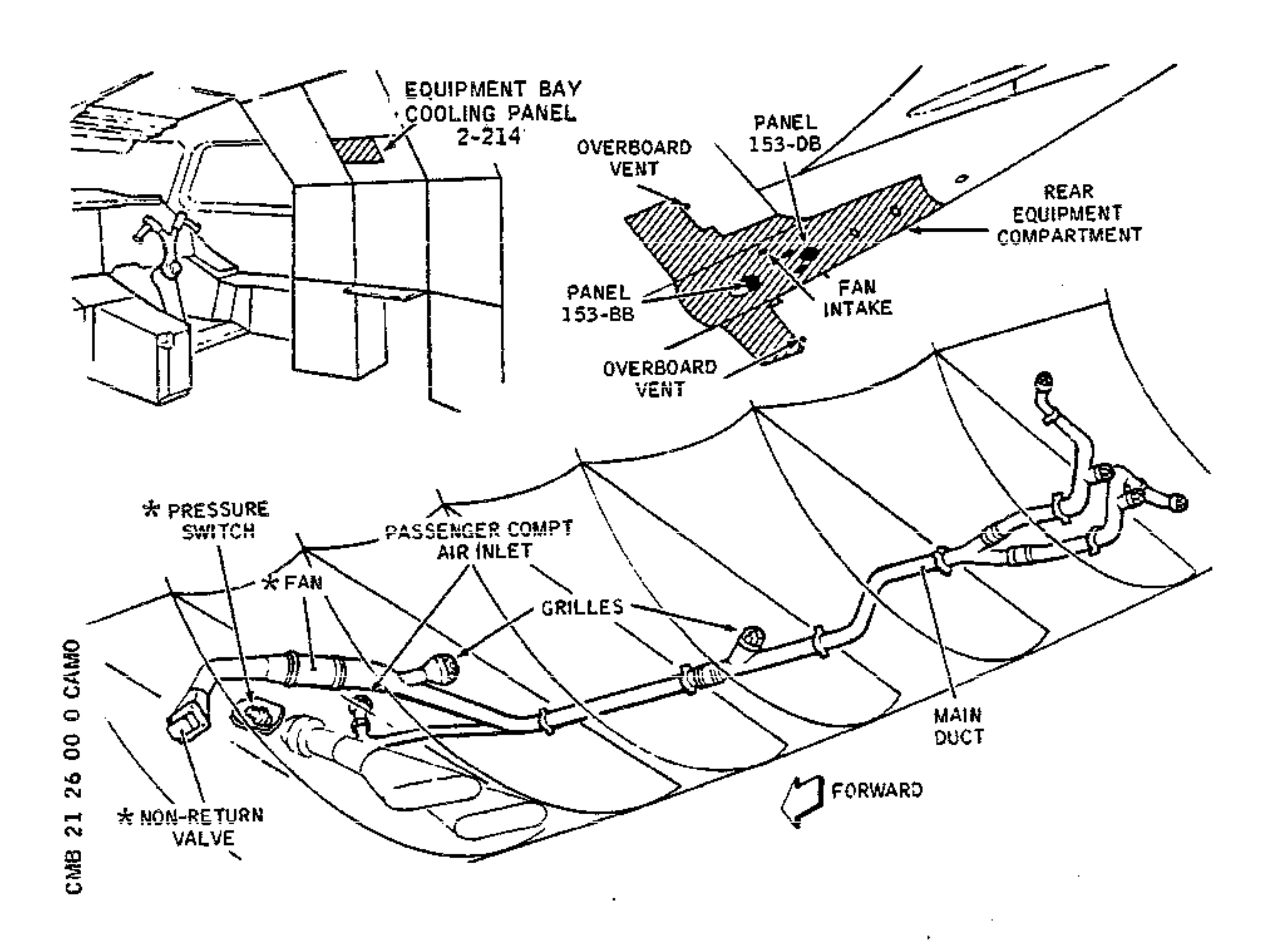
A single pressure switch is mounted on the top of the pressure floor adjacent the air conditioning rear discharge valves. It senses the pressure differential between the passenger compartment and the rear equipment compartment and by this means controls the running of the fan and its associated magnetic indicator.

The switch has a cylindrical body, divided by a flexible diaphragm one side of which communicates with the passenger compartment and the other with the rear equipment compartment. A change-over switch is operated by deflection of the diaphragm and is set to change over when the pressure in the passenger compartment reaches a value between 350 and 500 mb in excess of that in the rear equipment compartment. As the pressure differential decreases to below this value the switch operates to close the appropriate contacts to energize the fan control relay and start the fan; as the pressure differential rises past this range the fan is switched off.

5. Ducting

The system ducting comprises a main duct with a number of open-ended branch pipes leading from it. A stainless steel grille, secured by a wormdrive clip, is fitted in the end of each branch pipe.

A duct from an aperture in the aircraft skin, incorporating the fan and the N.R.V., and a duct from the inlet in the pressure floor are connected to the main duct. All ducts are of light alloy; joints between them are made with glass/ silicone sleeves secured by wormdrive clips. The duct is supported throughout by rubber-lined pipe clips. Both end flanges of the fan are secured to the associated components by clamping collars.



* THESE ITEMS ARE DELETED BY SB 53-053 AND MAY BE REMOVED OR ELECTRICALLY ISOLATED AT THE OPERATORS DISCRETION.

\- Rear Equipment Compartment Purging System
\- Installation
Figure 002

R

After SB 53-053

5. <u>Ducting</u>

The system ducting comprises a main duct with a number of open-ended branch pipes leading from it. All ducts are of light alloy; joints between them are made with glass/silicone sleeves secured by wormdrive clips. The duct is supported by rubber-lined pipe clips. A stainless steel grille, secured by a wormdrive clip, is fitted in the end of each branch pipe.

Before SB 53-053

6. <u>Operation</u>

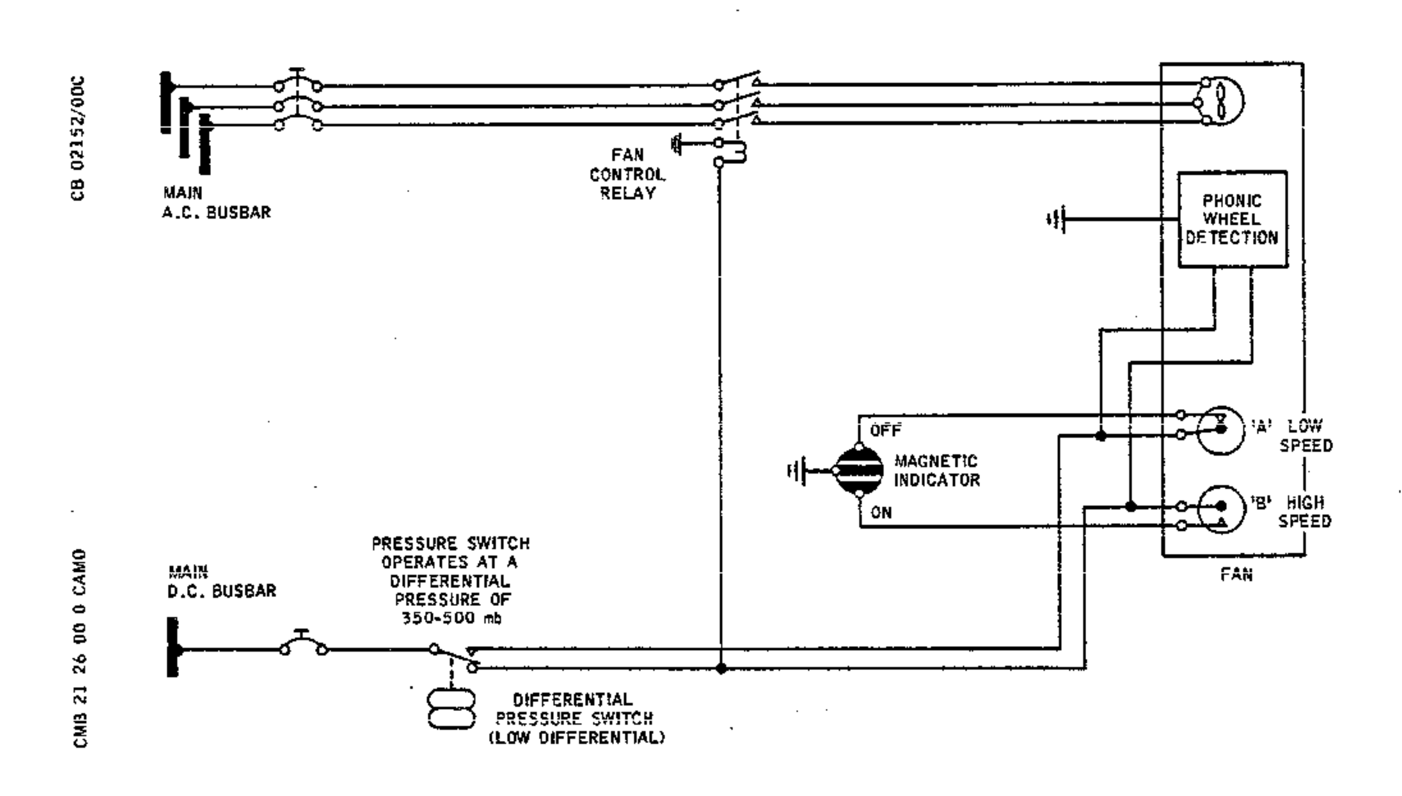
With electrical power on and the cabin pressure exceeding the ambient pressure by an amount less than the pressure switch setting, the fan control relay is energized. The fan is started and forces air into the rear equipment compartment to purge it of flammable vapour. (Ref. Fig. 003)

When the fan reaches the operating speed, the HYD BAY FAN magnetic indicator on the EQUIPMENT BAY COOLING section of panel 2-214 shows ON. At fan speeds below 8000 rpm, including fan failure, the magnetic indicator shows cross hatch.

As the aircraft gains altitude the ambient pressure decreases. When the cabin pressure exceeds the ambient pressure by an amount equal to the setting of the pressure switch, the switch operates to de-energize the fan control relay, isolating the fan from the supply and changing the magnetic indicator to OFF. Air is now supplied to the rear equipment compartment from an inlet in the pressure floor via the main duct. The NRV is closed to prevent this air from flowing from the outer end of the main duct and so bypassing the purging systems. From the compartment, the air is expelled through a grille at the inboard end of each wing rear spar.

When the pressure differential again drops to the pressure switch setting, the fan control relay is energized and the switching cycle proceeds.

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NOTE: AFTER SB 53-053, THIS SYSTEM IS ELECTRICALLY ISOLATED.

Rear Equipment Compartment Purging System
- Electrical Circuit.
Figure 003

R

REAR EQUIPMENT COMPARTMENT PURGING - TROUBLE SHOOTING

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS IN 24-00-00.

1. General

Faults are dealt with on a probability basis and identified as a result of testing.

The defect can be isolated with the aid of trouble shooting procedures (Ref. paras. 3, 4 and 5), and traced through OK, NOT OK paths to the appropriate charts or other specified rectification action as may be necessary. If a defect occurs, perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure that the operation is OK.

Bracketed numbers in the procedures and charts indicate items on the component identification table (Ref. Table 101). The table provides information, including component location, required for rectification. Component location also indicates the possible necessity of repositioning certain items of ground service equipment. Each chart also specifies the ground equipment required for that particular task.

All procedures dealing with trouble shooting are based on the assumption that electrical wiring is serviceable and that electrical power is available unless otherwise stated. If the fault is not rectified, check the wiring in accordance with the Wiring Diagram Manual (Ref. Table 101).

2. Preparation

(1) Trip the pressure switch circuit breaker, H1791 on panel 15-216, map ref. E24, and fit a safety clip.

(2) Check that circuit breaker H1792 on panel 13-216, map ref. C21, is set.

(3) Make available electrical ground power (Ref. 24-41-00, Servicing).

(4) Ensure that the following ground equipment is available:

DESCRIPTION	PART NO.	
Anemometer	-	
Anemometer	Wallace Type GGA 23S	) Ref.) para.4

DESCRIPTION	PART NO.	
Air pressure rig, with gauge, capable of supplying 8.6 psig (0.6 bars)	-	) Ref.) para. 5)

3. Trouble Shooting

A. *Prepare to trouble shoot (Ref. para.2). Check that HYD BAY FAN MI displays diagonal stripes.*

OK → B.

NOT OK → Renew magnetic indicator (3).

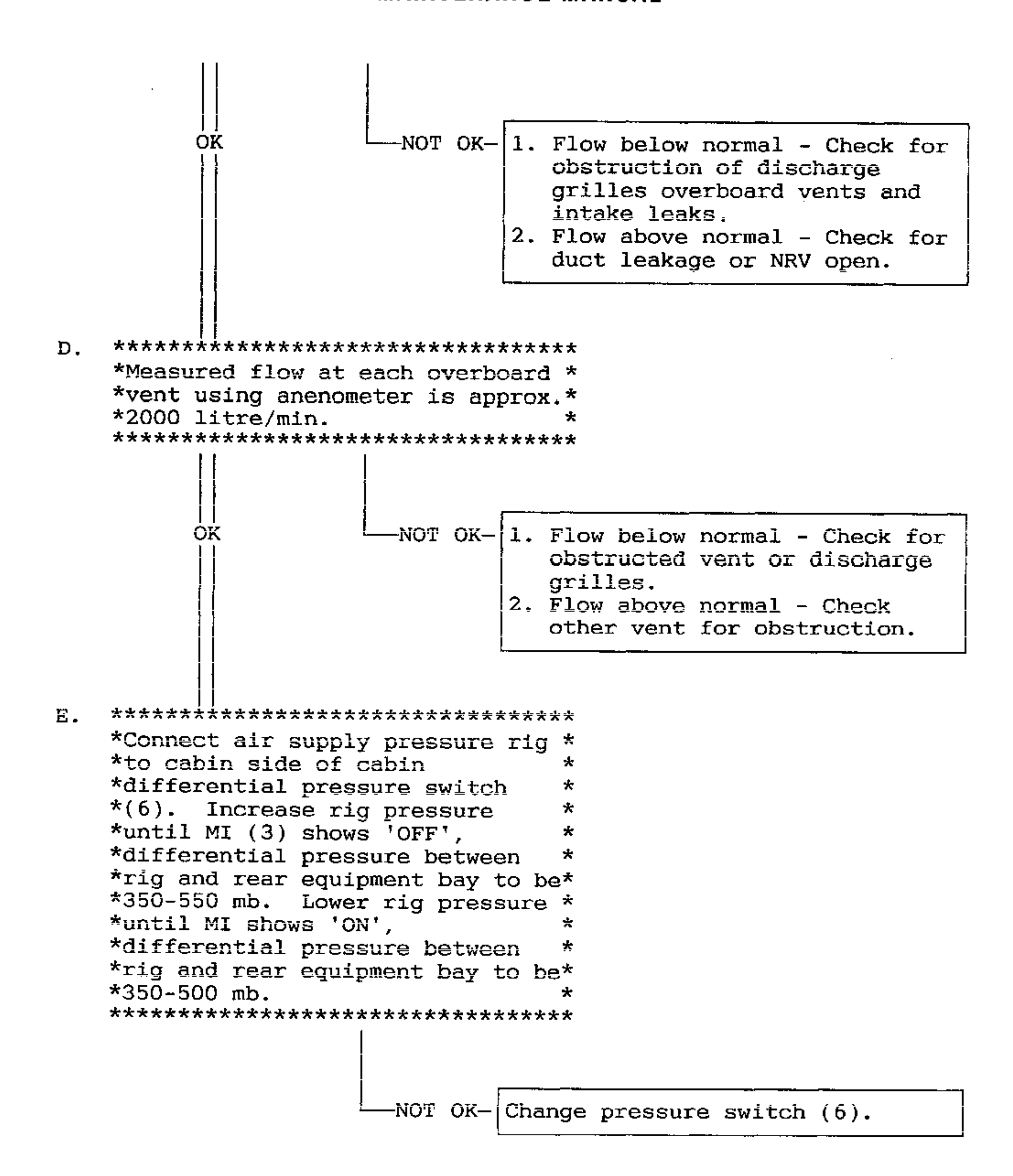
B. *Set CB (1). Check that fan (4) starts immediately and that MI (3) displays 'ON' in 2 seconds.*

OK → C.

NOT OK →
1. Fan does not start immediately - Chart 101.
2. MI displays 'ON' after 2 seconds - Chart 102.
3. MI does not display 'ON' - Chart 102.

C. *Measured flow at fan inlet using anemometer is approximately 6500 litre/min.*

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OK
NOT OK
1. Flow below normal - Check for obstruction of discharge grilles overboard vents and intake leaks.
2. Flow above normal - Check for duct leakage or NRV open.
D.
Measured flow at each overboard vent using anenometer is approx. 2000 litre/min.
OK
NOT OK
1. Flow below normal - Check for obstructed vent or discharge grilles.
2. Flow above normal - Check other vent for obstruction.
E.
Connect air supply pressure rig to cabin side of cabin differential pressure switch (6). Increase rig pressure until MI (3) shows 'OFF', differential pressure between rig and rear equipment bay to be 350-550 mb. Lower rig pressure until MI shows 'ON', differential pressure between rig and rear equipment bay to be 350-500 mb.
NOT OK
Change pressure switch (6).

FAN DOES NOT START IMMEDIATELY CB (1) IS SET.

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO
GROUN POWER SUPPLY	
MULITMETER	
CIRCUIT BREAKER	
SAFETY CLIPS	

Check	YES
Check if CB (2) has tripped.	Fit safety clip on CB (2) - check for earth on pins and sockets A,B,C of fan (4) and renew fan control relay (5) or fan (4) respectively.
NO ↓	
Check for 200V a.c. between pins A,B,C of plug on fan (4)	Renew fan (4).
NO ↓	
Check for 200V a.c. between pins J,H,F of plug U1813 of relay box 14-213.	Remove relay (5).
NO ↓	
Check for 200V a.c. between terminals A1,B1,C1 of CB (2)	Renew CB (2).
NO ↓	
Check for 28V d.c. at test point A1 of terminal block U1809 on relay box 14-123.	Renew relay (5).
NO ↓	
Check for 28V d.c. at pin A	Renew pressure switch (6).

```
R   |of plug at pressure switch(6)|      -------------------------------
R   -------------------------------
R                 |
R                NO
R                 |
R   -------------------------------      -------------------------------
R   |Check for 28V d.c. at term 1 |-YES-|Renew CB (1).                 |
R   |of CB (1).                   |      -------------------------------
R   -------------------------------
```

R Chart 101

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MI (1) DISPLAYS 'ON' MORE THAN 2 SECONDS AFTER CB (1) 15 SET OR DOES NOT DISPLAY 'ON'.

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO
GROUND POWER SUPPLY	
MULTIMETER	
CIRCUIT BREAKER	
SAFETY CLIPS	

Check that CB (1) is set.

YES

Check that MI (3) displays 'ON' after 2 seconds or does not display 'ON'.

YES

Check 28V d.c. at scoket G of receptacle on fan is present within 2 seconds. -YES- Renew MI (3).

NO

Check 28V d.c. present at pin F of plug of fan (4) immediately CB (1) is set. -YES- Renew fan (4).

NO

Check 28V d.c. present at pin A of pressure switch (6) immediately CB (1) is set. -YES- Renew pressure switch (6).

NO

Check 28V d.c. present at -YES- Renew CB (1).

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R |terminal 1 of CB (1). | ------------------------------
R ------------------------------

R Chart 102

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
(1) Circuit breaker 28V	-	15-216	H1791	Map ref.E24	24-50-00	24-52-12
(2) Circuit breaker 200V	-	13-216	H1792	Map.ref.C21	24-50-00	24-51-13
(3) Magnetic indicator	-	2-214	H1793	3-CM Station	21-26-00	21-26-51
(4) Fan	153BB	243/4	H1795	Rear equipment compartment	21-26-00	21-26-51
(5) Fan control relay	123BB	14-123	H1794	Fwd under-floor racking	21-26-00	21-26-51
(6) Pressure switch	243EF	167	H1796	Pressure floor	21-26-00	21-26-51

Component Identification
Table 101

REAR EQUIPMENT COMPARTMENT PURGING - ADJUSTMENT/TEST

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED IN 24-00-00.

1. General

This system is designed to purge the rear underfloor equipment compartment of fuel and hydraulic fluid vapour. The functional
R test includes a flow test.
R

2. Functional Test (Ref. Fig. 501)

A. Equipment and Materials

DESCRIPTION	PART NO.
Extension lamp (spark proof)	-
Anemometer	Wallac Type GGA 23S
Air pressure rig with flowmeter (Capable of a flow rate of 10,000 litres/min)	-

B. Prepare to Test

(1) Remove floor panels 243 HF and 243 KF and connect the pressure rig to a convenient duct outlet.

C. Flow Test

(1) Start the pressure rig and increase the flow rate to 10,000 litres/min.

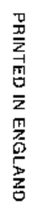
(2) Measure the flow at each of the five remaining duct outlets with the Wallac anemometer. Check that the flow rate is approximately 2,000 litres/min.

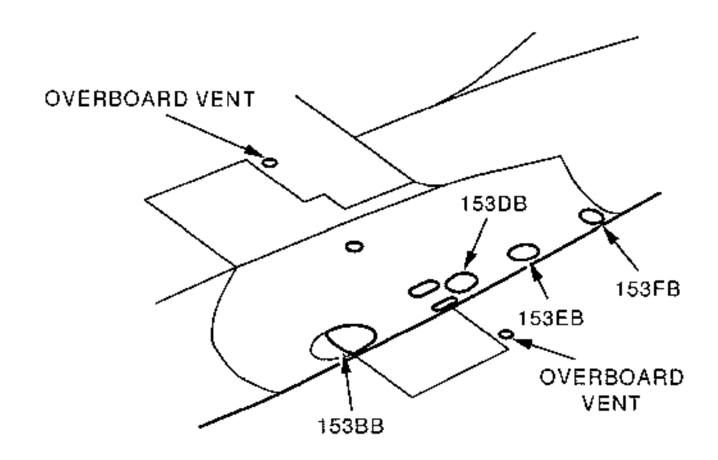
(3) Reduce pressure to zero and disconnect the pressure rig.

D. Close-Up

(1) Fit floor panels 243 HF and 243 KF.

REAR BAGGAGE COMPARTMENT DOOR
FRAME 81
PANEL 243 KF
PANEL 243 HF
FRAME 75
PANEL 243 DF
FRAME 74





CMB 21 26 00 5 AAM0 00

R

Rear Equipment Compartment Purging - Access
Figure 501

REAR EQUIPMENT COMPARTMENT PURGING FAN - REMOVAL/INSTALLATION

R WARNING : OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED IN
R 24-00-00.

1. General

Access to the fan is gained by opening hinged panels 153BB and 153DB. A data plate riveted to the fan casing indicates the direction of airflow through the fan.

2. Fan (Ref. Fig. 401)

A. Equipment and Materials

	DESCRIPTION	PART NO.
	Circuit breaker safety clip	-
R	Torque spanner 45-55 lbf in (0.51-0.62 mdaN) range	
R R	Corrosion resistant steel wire, 0.031 in (0.8 mm) dia	-
R	Grease, Aeroshell 16 (Ref. 20-30-00, No.51)	-

B. Prepare to Remove Fan

(1) Electrically isolate the fan by tripping the relevant circuit breakers listed below. Fit safety clips.

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
R	HYD BAY VENT FAN CONT & IND	15-216	H1791	E24
R	HYD BAY VENT FAN SUP	13-216	H1792	C21

(2) Open access panels 153BB and 153DB (Ref. Fig. 401).

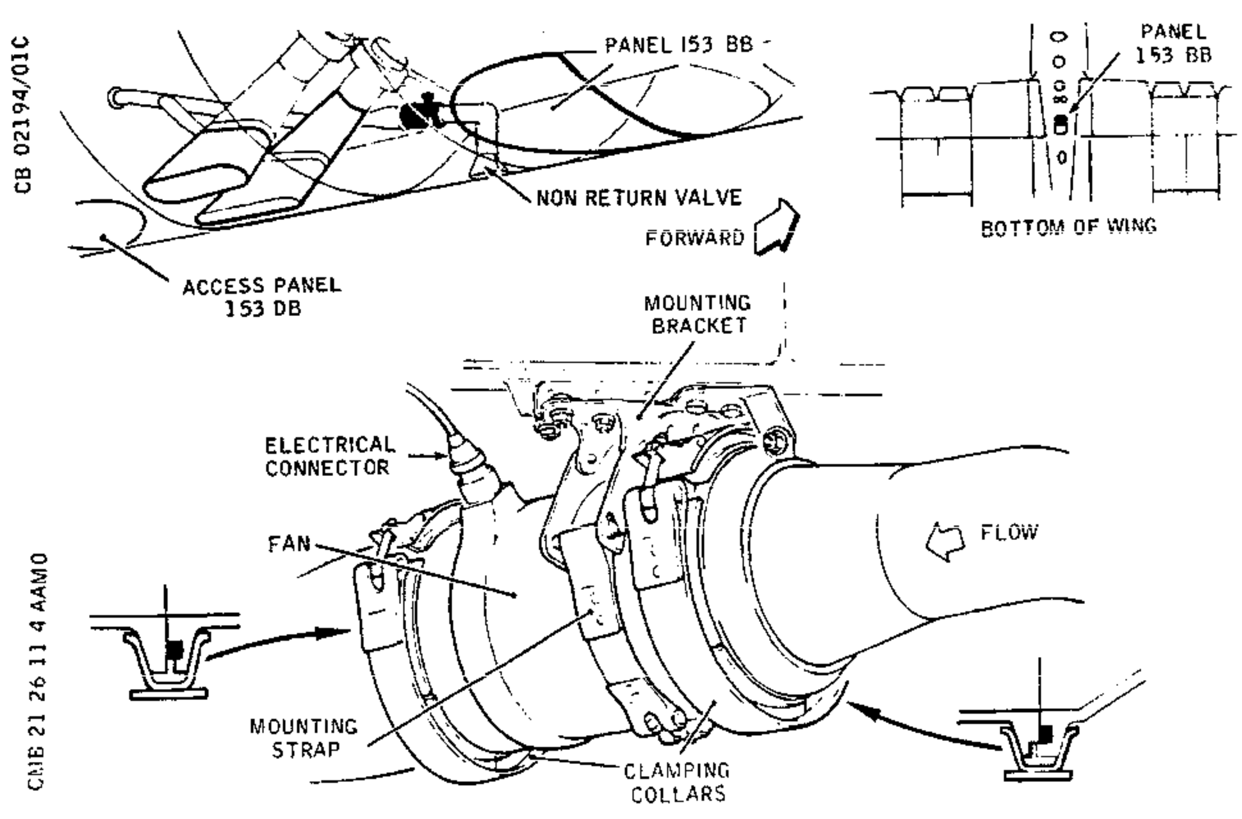
C. Remove Fan

(1) Disconnect the electrical connector from the fan.

(2) Remove the clamping collar securing each end of the fan.

(3) Support the fan, then remove and retain the bolt securing the fan mounting straps. Remove the fan. Remove and discard the O-ring seals fitted in the duct flanges.

R (4) Fit approved blank covers to the exposed ports.



Fan - Access and Installation
Figure 401

D. Install Fan

(1) Comply with the electrical safety precautions.

(2) Remove the blank covers from the fan and from the ducts.

(3) Position new O-ring seals in the recesses in the flanges of the ducts.

(4) Position the fan against the fan mounting bracket, between the main duct and the inlet duct, ensuring that the direction of flow arrow points aft and that the electrical receptacle is approx. 25 deg inboard from the top.

(5) Hold the mounting strap in position, insert the securing bolt and secure hand tight.

R (6) Connect the electrical connector to the fan,
R ensuring that the mating surfaces are clean and
R undamaged.

(7) Ensure that the O-ring seals are in place and secure both ends of the fan to the duct with
R clamping collars. Torque-tighten each clamp to 45-50 lbf in (0.51-0.57 mdaN).

R (8) Tighten the mounting strap self-locking nut or wire-
R lock with locking wire as appropriate.

R E. Conclusion

R (1) Remove the circuit breaker safety clips and reset
R the circuit breakers (H1791 and H1792).

R (2) Carry out a functional test (Ref. 21-26-00, Adjust-
R ment/Test).

R (3) Fit access panels 153BB and 153BD.

R **ON A/C 006-007,

After SB 21-029 For A/C 001-005,

Tighten the self-locking nut securing the mounting strap.

(9) Remove the clips and set the circuit breakers (H1791 and H1792).

(10) With electrical ground power connected (Ref. 24-41-00), ensure that there is a flow of air from the grille in the main duct near the fan.

(11) Fit access panels 153BB and 153DB.

REAR EQUIPMENT COMPARTMENT - NON-RETURN VALVE - REMOVAL/INSTALLATION

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED IN 24-00-00.

1. General

A non-return valve (NRV) is located on the fuselage skin in the rear equipment compartment and is connected to the purging system fan via a duct. Access to the NRV is gained by opening hinged access panel 153 BB.

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit breaker safety clips	-
Torque spanner 30-50 lbf in (0.339 - 0.565 mdaN) range	-
Chromium nickel steel wire 0.028 in (0.7 mm) dia.	-

2. Non-return Valve - Removal/Installation (Ref. Fig. 401)

B. Prepare to Remove NRV

(1) Electrically isolate the fan by tripping the circuit breakers listed below. Fit safety clips.

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
R	HYD BAY VENT FAN CONT & IND	15-216	H1791	E24
R	HYD BAY VENT FAN SUP	13-216	H1792	C21

(2) Open access panel 153 BB.

C. Remove NRV

Non-return valve - Access and Installation.
Figure 401

(1) Remove and retain the ten 10-32 UNF bolts and washers that secure the outboard flange of the inlet duct to the NRV.

(2) Support the duct and remove the 10-32 UNF location nut and bolt that secures the lug on the inboard duct flange assembly to the location bracket. Retain the items for reassembly.

(3) Remove the collar that secures the inlet duct to the fan.

(4) Remove the duct and the gasket fitted between the duct and the NRV. Discard the O-ring seal fitted between the duct and the fan.

(5) Fit a blank cover to the fan inlet and protect the duct from the ingress of foreign matter.

(6) From outside the aircraft, remove and retain the four 0.25 in (6.35 mm) UNF countersunk screws that secure the NRV to the skin.

(7) Remove the NRV inwards.

D. Install NRV

(1) Comply with the electrical safety regulations.

(2) Fit the NRV to the fuselage skin, inside, and secure it from outside with four 0.25 in (6.35 mm) UNF countersunk screws.

(3) Remove the blank cover from the fan. Place a new O-ring seal in position and assemble the duct loosely to the fan with a collar.

(4) Place a gasket between the outboard duct flange and the NRV, align the duct and loosely attach the lug on the inboard duct flange assembly to the location bracket with a 10-32 UNF bolt and nut.

(5) Secure the duct to the NRV with ten 10-32 UNF bolts and washers.

(6) Carefully tighten the collar that clamps the duct to the fan to a torque of 45 to 50 lbf in (0.5088 to 0.565 mdaN).

(7) Torque load the location bolt to between 30 and 40 lbf in (0.339 and 0.452 mdaN).

(8) Remove the safety clips and reset circuit breakers H1791 and H1792.

R (9) Operationally test the rear equipment bay purging
R system as detailed in 21-26-00, Adjustment/Test.

(10) Close access panel 153 BB.

REAR EQUIPMENT COMPARTMENT PURGING - PRESSURE SWITCH
REMOVAL/INSTALLATION

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED IN 24-00-00.

1. General

The electrical pressure switch, which controls the fan in the rear equipment compartment purging system, is installed between the pressure floor and the rear baggage compartment floor, to the left of the rear main air conditioning discharge valves, in zone 167.

2. Pressure Switch (Ref. Fig. 401)

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit breaker safety clip	-
Torque spanner, 0-40 lbf in (0-0.45 mdaN range)	-

B. Prepare to remove Pressure Switch

(1) Electrically isolate the pressure switch by tripping circuit breaker H 1791 on panel 15-216, map ref. E24. Fit a circuit breaker safety clip.

(2) Remove floor panel 243 EF.

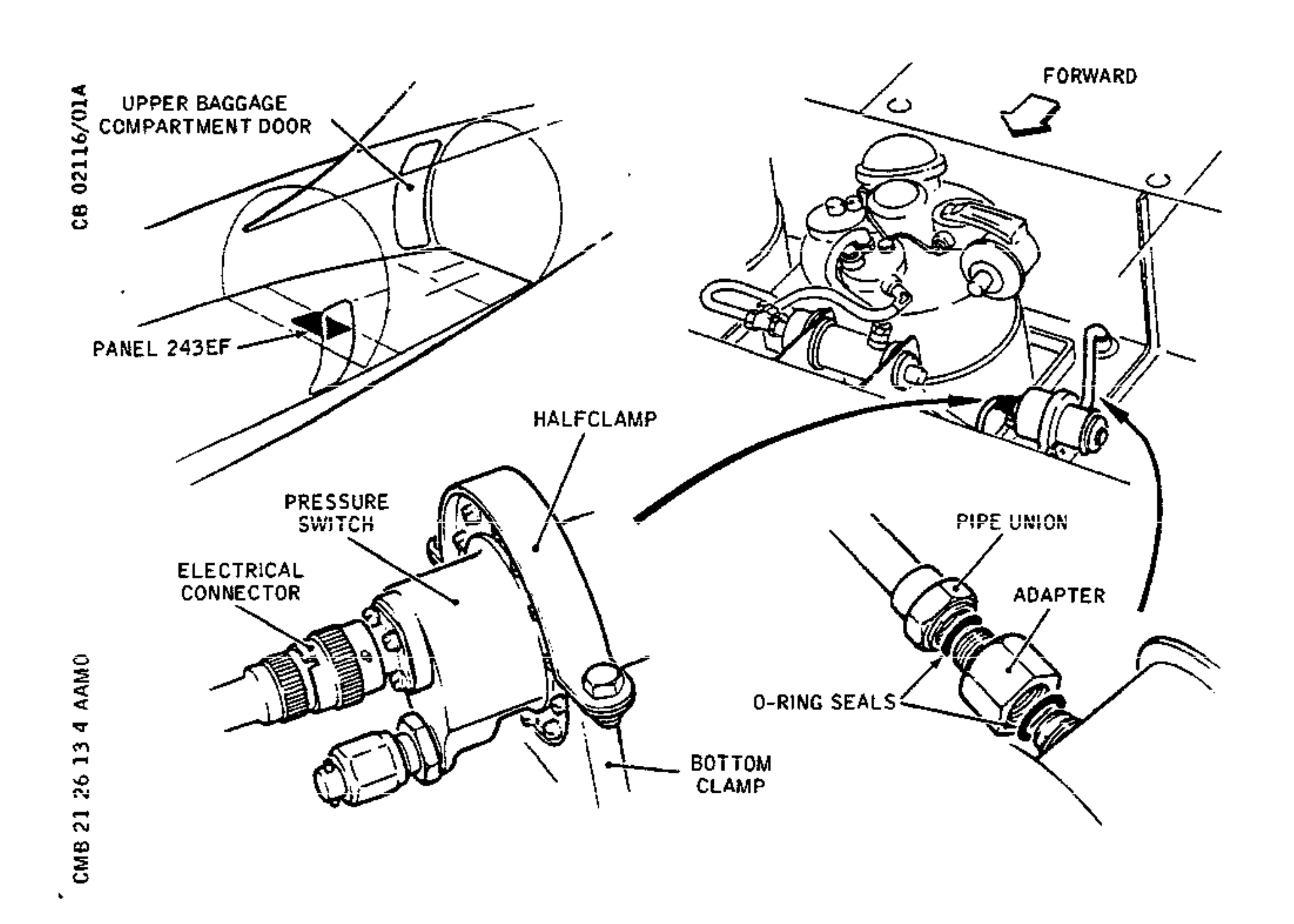
C. Remove Pressure Switch

(1) Disconnect the electrical connector from the pressure switch.

(2) Unscrew the pipe union from the adaptor on the side of the pressure switch body.

(3) Remove the two nuts, bolts and washers that secure the half-clamp. Remove the pressure switch. Fit a blank cover over the exposed end of the pipe.

(4) If a new pressure switch is to be fitted, remove



Pressure Switch - Installation
Figure 401

R

the adaptor from the switch body. Fit a blank cover to the exposed port in the switch body. If the same switch is to be fitted, fit a blank cover to the adaptor.

D. Install Pressure Switch.

(1) Comply with the electrical safety precautions.

(2) If a new switch is being fitted, remove the blank cover from the port on the side of the switch. Fit a new O-ring seal, and the adaptor, to the port. If installing the switch that has been removed, remove the blank cover from the adaptor.

(3) Position the switch in the bottom half of the clamp; fit the top half-clamp over the switch and secure it with the two bolts, washers and nuts, finger-tight.

(4) Remove the blank cover from the pipe. Fit a new O-ring seal to the adaptor and connect the pipe union to the adaptor, finger-tight.

(5) Torque load the clamp nuts to 35 to 40 lbf in. (0.4 to 0.45 mdaN).

(6) Torque-load the pipe union to 75 to l25 lbf in. (0.84 to 1.41 mdaN).

(7) Connect the electrical connector to the switch, ensuring that the mating surfaces are clean and undamaged.

(8) Remove the safety clip from circuit breaker H 1791 and set the circuit breaker.

R **ON A/C 001=006,

B (9) Deleted.

B (10) Fit the access panel 243EF.

R **ON A/C 007-007,

(9) Function test the switch as detailed in 21-26-00 Adjustment/Test.

(10) When the requirements of the test have been satisfied, fit the access panel, 243 EF.

END OF THIS SECTION

NEXT

FORWARD EQUIPMENT (HYDRAULIC CHASSIS) COMPARTMENT VENTILATION - DESCRIPTION AND OPERATION

1. General (Ref. Fig. 001)

The forward hydraulic chassis is shrouded and ventilated to eliminate the fire and explosion hazard that would exist if hydraulic oil mist contaminated the underfloor electrical connections and equipment. The chassis ventilated area is located under the flight compartment floor and access to it is obtained by removing the ventral access panels.

The segregation of the hydraulic and electrical equipment is achieved by segregation panels which incorporate viton rubber coated nomex curtains. These panels, which form a bay around the chassis, are attached to the floor support struts of the aircraft structure.

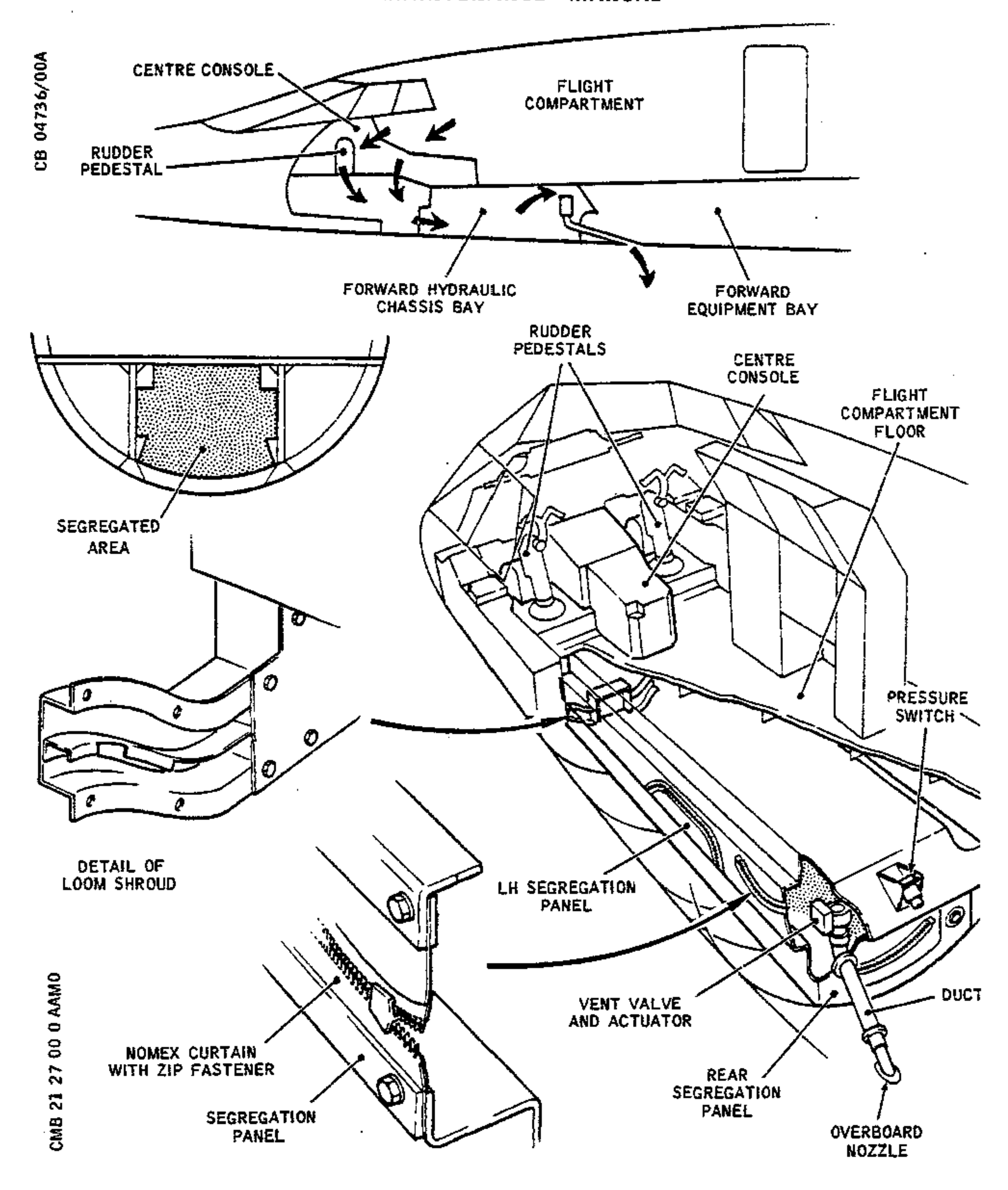
Ventilating air, induced by cabin differential pressure, flows from the flight compartment via the rudder pedestals and the centre console to the hydraulic chassis bay. The air is discharged overboard through a vent nozzle in the skin of the forward equipment bay via an electrically actuated butterfly vent valve. The control and indication for the valve are on the Cabin Pressure Control panel at the 3CM station, and a pressure switch provides a barometric override control of the system.

2. Segregation Panels (Ref. Fig. 001)

There are three segregation panels, a rear transverse panel and two side panels which, together with a loom shroud, form the ventilated compartment around the chassis. The rear panel incorporates fairleads through which the control cables pass, and also provides a mounting for the vent valve on its forward side and for the pressure switch on its aft side. These light alloy panels which contain viton coated nomex curtains are bolted to the floor support struts of the aircraft structure. The nomex curtains contain heavy duty zip fasteners to allow access through the curtains to the compartments formed between the segregation panels and the aircraft skin. The sealing of the panels in the corner reliefs and at joggles is made with Thiokol, and all cut-outs and cleat joints are sealed with glass cloth coated with Viton sealant. The light alloy seal attachment members are coated with polychloroprene rubber.

3. Vent Valve (Ref. Fig. 002)

An electrically operated vent valve is installed at the rear of the forward hydraulic chassis bay. The valve is clamped by a V flange coupling to the vent pipe which protrudes into the bay



R Forward Hydraulic Chassis Ventilation
Figure 001

from the rear segregation panel. In the event of decompression which caused the cabin altitude to reach 11,000 ft the valve operates to shut off air flow that normally ventilates the forward chassis area.

The valve comprises a light alloy body housing a butterfly flap, mounted on a spindle. A 28V d.c. electrical actuator, bolted to the valve body, rotates the spindle through 90 deg to close or open the flap. A visual indicator showing the flap position, operated directly from the valve spindle is on the side of the valve body. The V flange of the valve body which is coupled to the vent pipe is recessed to seat an O-ring seal. When the actuator is operated its shaft rotates to open or close the valve butterfly as selected, and microswitches within the actuator give a signal to the indication on the Cabin Pressure Control panel to show when the valve is fully open or fully shut.

4. Pressure Switch (Ref. Fig. 001)

R This switch controls the vent valve, which it closes should the cabin altitude reach 11,000 ft. The switch is in the forward equipment bay, secured to a bracket which is fixed to the rear of the rear segregation panel of the hydraulic chassis bay.

The cylindrical body of the switch is partitioned to form two chambers, one chamber, which has an aperture open to ambient pressure, contains a pressure-sensitive diaphragm which, when deflected, operates the electrical switch contacts in the other chamber.

The switch is supplied with 28V d.c. from the main busbar.

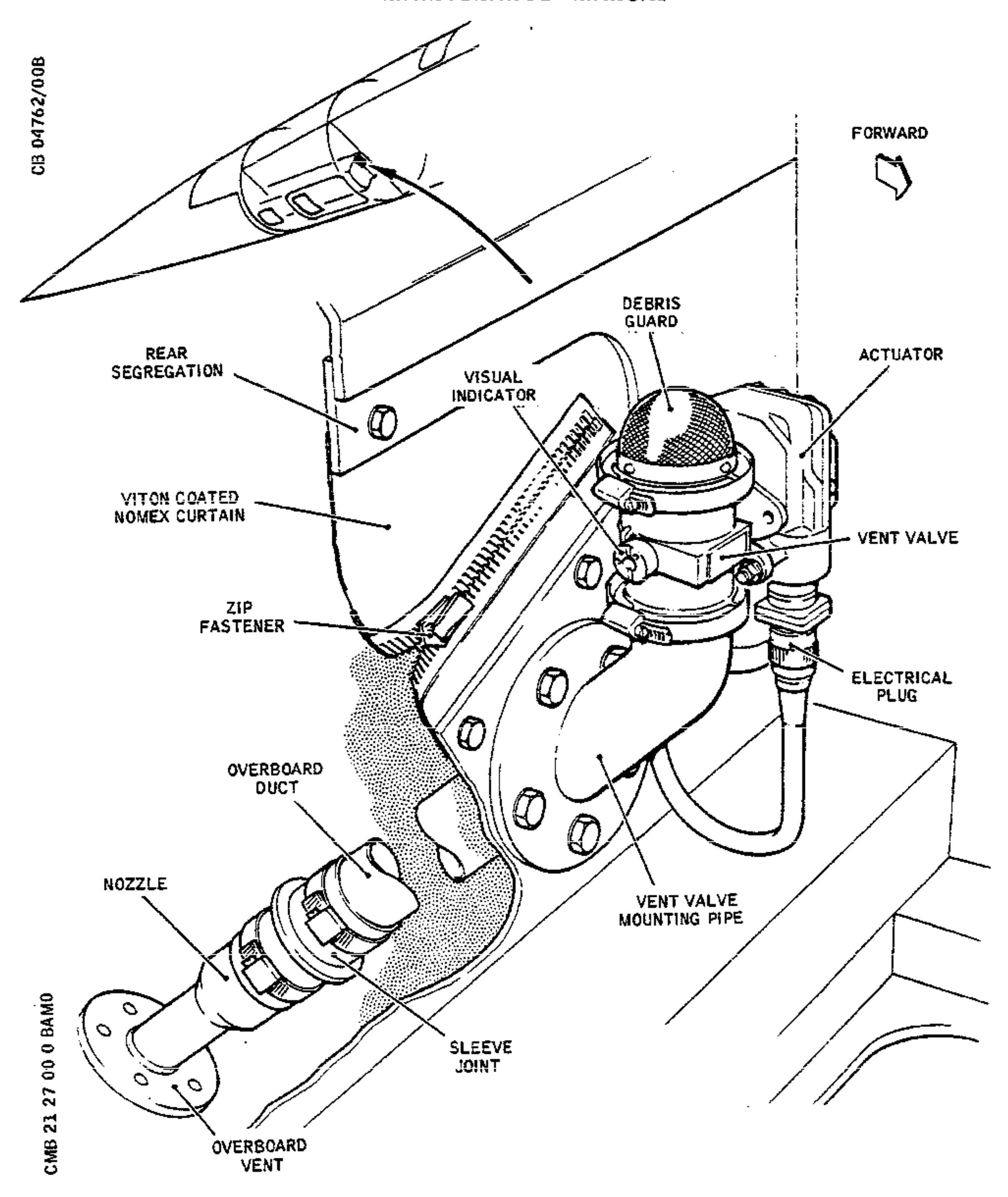
R

5. Ducting (Ref. Fig. 002)

The ducting which carries the air overboard from the vent valve through the forward equipment bay, is fabricated from light alloy. The duct pipe assembly is bolted to the aft face of the rear segregation panel, where it mates with the vent valve mounting pipe, and at its other end is jointed to the overboard nozzle with a rubber sleeve joint and worm drive clips. The nozzle assembly, which is a light alloy casting, is riveted to the aircraft structure around the aperture in the aircraft skin.

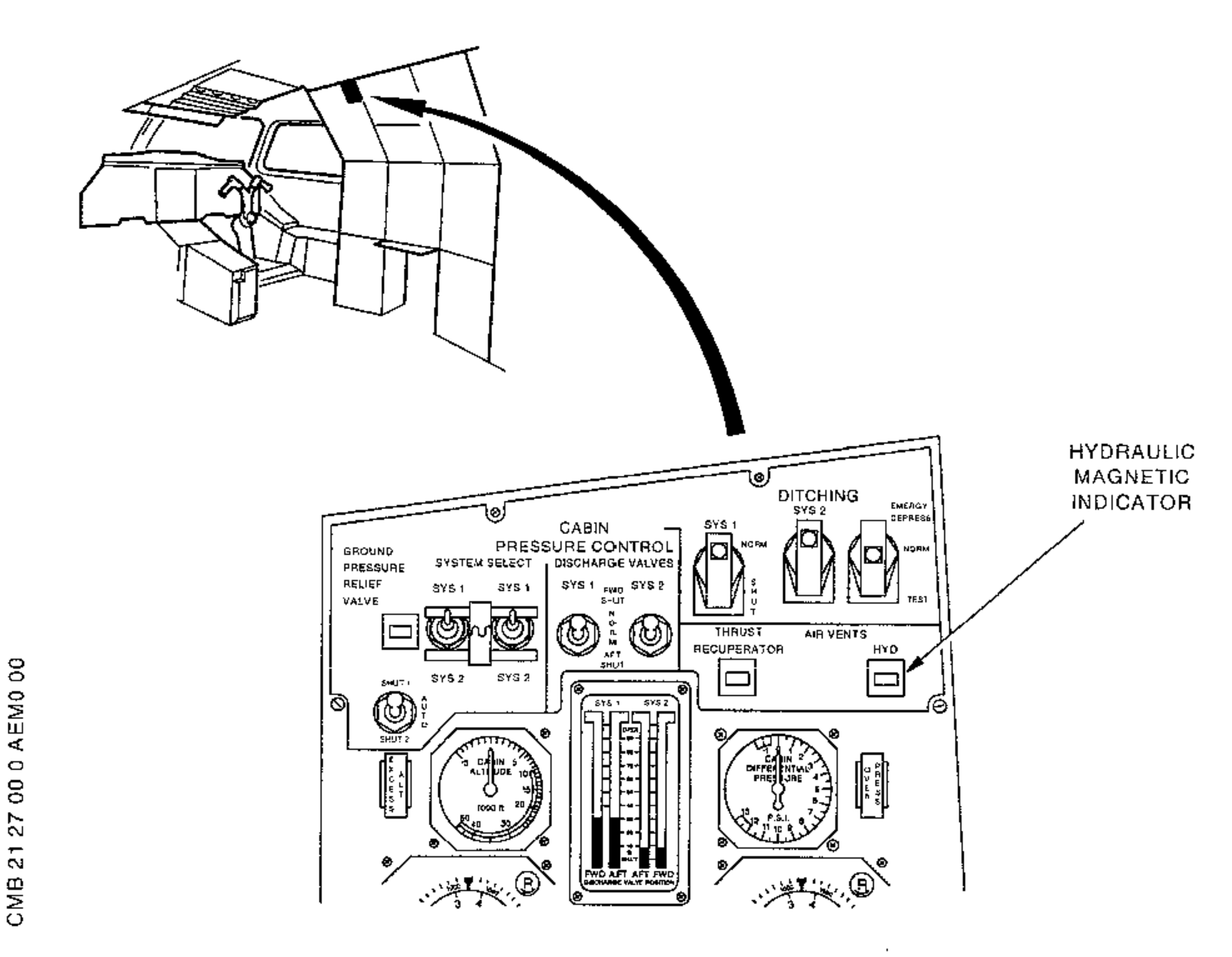
6. Operation (Ref. Fig.003 and 004)

The chassis is ventilated by air from the flight compartment and this air is ducted overboard via the butterfly vent valve
R which is normally open. 28V d.c. from the main busbars



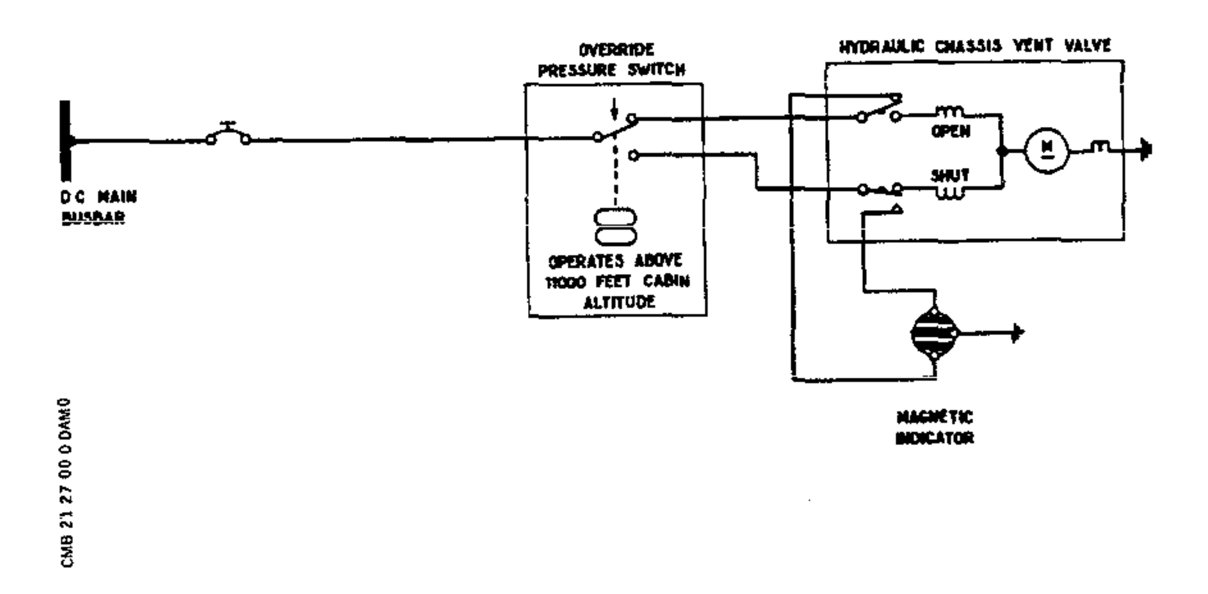
R

Vent Valve
Figure 002



Control and Indication
Figure 003

supplies the vent valve actuator and the magnetic indicator via the pressure switch. The barometric pressure switch operates to close the valve at the preset cabin altitude condition. The magnetic indicator shows SHUT, crosshatch or OPEN according to the valve position.



Hydraulic Chassis Vent Valve Control and Indication - Schematic Diagram
Figure 004

FORWARD EQUIPMENT (HYDRAULIC CHASSIS) COMPARTMENT VENTILATION - TROUBLE SHOOTING

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS IN 24-00-00.

1. General

Faults are dealt with on a probability basis and identified as a result of testing.

A defect can be isolated with the aid of trouble shooting procedures (Ref. para.3), and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary. If a defect occurs, perform the appropriate rectification action, then repeat the operation at which the defect was encountered, to ensure that the operation is OK.

Bracketed numbers in the procedures and charts indicate items on the component identification table (Ref. Table 101). The table provides information, including component location, required for rectification. Each chart specifies any ground equipment required for that particular task.

All procedures dealing with trouble shooting are based on the assumption that electrical wiring is serviceable, and that electrical power is available, unless otherwise stated. If the fault is not rectified, check the wiring in accordance with the Wiring Diagram Manual (Ref. Table 101).

2. Preparation

R A. Equipment and Materials

DESCRIPTION	PART NO.
R Negative pressure rig R -10psig (-0.684 bar) R	-

R B. Prepare

R (1) Trip circuit breaker H1928 on panel 15-215, map
R ref. G2 and fit safety clip.

(2) Make available electrical ground power (Ref. 24-41-00).

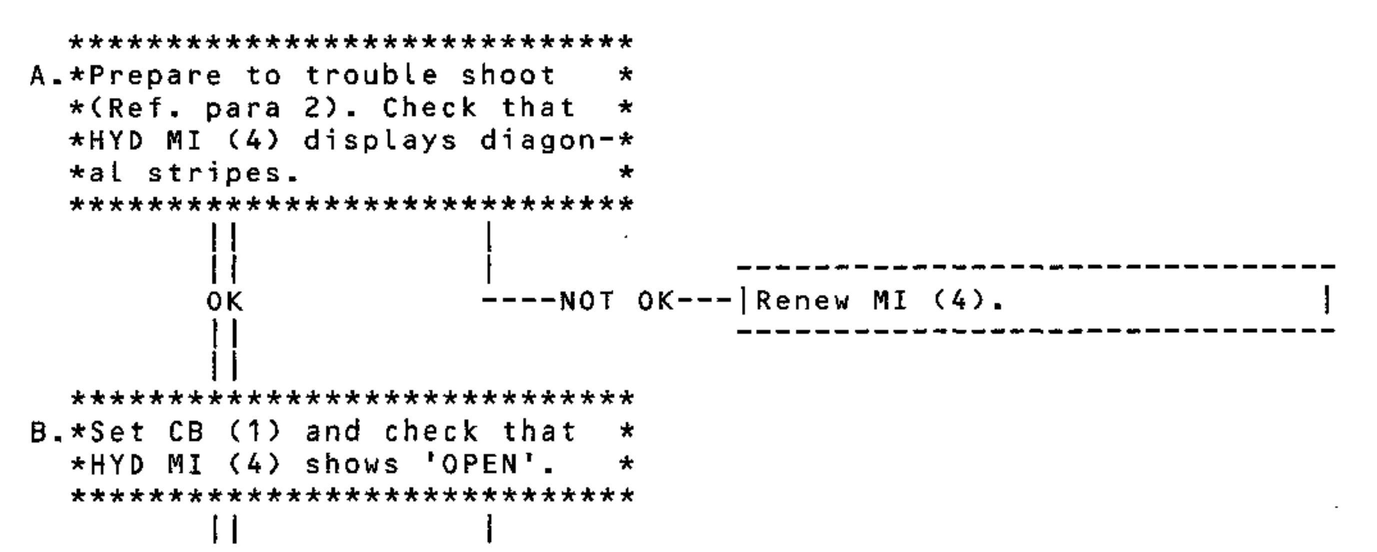
(3) Remove access panel 121 GB for access to the vent valve.

(4) Remove floor panel 215 AF for access to the pressure switch.

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
(1) Circuit breaker 28V	-	15-215	H1928	Map ref.G2	21-27-00	21-27-11
(2) Pressure switch	215AF	121	H1930	Rear of fwd hydraulic bay	21-27-11	21-27-11
(3) Vent valve	121GB	121	H1931	Rear of fwd hydraulic bay	21-27-12	21-27-11
(4) Magnetic indicator	-	1-214	H1929	3CM station	21-27-00	21-27-11

Component Identification
Table 101

3. Trouble Shooting



```
          ||             |            -------------------------------
          OK             ----NOT OK---|Refer to Chart 102.          |
          ||                          -------------------------------
          ||
  ****************************
C.*Apply a negative pressure *
  *of 5.5 psig (0.37 bar) max.*
  *to pressure switch (2).    *
  *Check that MI (4) displays *
  *'SHUT'.                    *
  ****************************
                         |
                         |            -------------------------------
                         ----NOT OK---|Refer to Chart 101.          |
                                      -------------------------------
                                      -------------------------------
```

HYD MI DOES NOT SHOW 'SHUT'

NOTE: A negative pressure of 5.5 psig (0.37 bar) is to be maintained during the following tests.

GROUND EQUIPMENT REQUIRED DESCRIPTION	PART NO
GROUND POWER SUPPLY	
MULTIMETER	
NEGATIVE AIR PRESSURE RIG	

HYD MI (4) shows 'OPEN' or stripes.

YES →

Check if mechanical indicator on valve (3) shows shut. -YES- Check for 28V d.c at HYD MI (4). -YES- Renew MI (4).

(Check for 28V d.c at HYD MI (4).) NO → Check wiring.

(Check if mechanical indicator on valve (3) shows shut.) NO →

Check if mechanical indicator on valve (3) shows valve in intermediate position -YES- Renew valve (3).

NO →

Check if mechanical indicator on valve (3) shows open. Remove socket from plug on actuator and check for 28V d.c at pins A and F in socket. -YES- Renew actuator on valve (3).

|

```
        |
        NO
        |
-------------------   -------------------
|Check for 28V d.c|-YES-|Check wiring.     |
|at pin B of      |   -------------------
|pressure switch  |
|(2).             |
-------------------
        |
        NO
        |
-------------------
|Renew pressure   |
|switch (2).      |
-------------------
```

Chart 101

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HYD MI DOES NOT SHOW 'OPEN'.

GROUND EQUIPMENT REQUIRED DESCRIPTION	PART NO
GROUND POWER SUPPLY	
MULTIMETER	

HYD MI (4) shows 'SHUT' or stripes.

YES ↓

Check if mechanical indicator on valve (3) shows open.
- YES → Check for 28V d.c at HYD MI (4).
  - YES → Renew MI (4).
  - NO → Check wiring.
- NO ↓

Check if mechanical indicator on valve (3) shows valve in intermediate position.
- YES → Renew valve (3).
- NO ↓

Check if mechanical indicator on valve (3) shows shut. Remove socket from plug on actuator and check for 28V d.c at pins A and B in socket.
- YES → Renew actuator on valve (3).
- NO ↓

```
|Check for 28V d.c|-YES-|Check wiring.     |
|at pin C of      |      ------------------
|pressure switch  |
|(2).             |
-------------------
        |
        NO
        |
-------------------
|Renew pressure   |
|switch (2).      |
-------------------
```

Chart 102

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FORWARD EQUIPMENT (HYDRAULIC CHASSIS) COMPARTMENT VENTILATION - REMOVAL/INSTALLATION

1. General

This topic contains general instructions for the removal and installation of minor electrical components fitted to panels common to the system. The removal and installation of major components are given separately under individual subject numbers.

The panel and the minor equipment affected is the magnetic indicator on the Power Management Panel (1-214).

CAUTION: ELECTROLUMINESCENT PANELS ARE SUSCEPTIBLE TO SCRATCHES AND CRACKS. ENSURE THAT THEY ARE HANDLED WITH CARE AND ARE NOT DAMAGED BY TOOLS.

2. Power Management Panel 1-214, Components (Ref. Fig. 401)

A. Prepare to Remove Magnetic Indicator (Electrical Code H 1929).

(1) Isolate the electrical generation and external power in accordance with 24-00-00, Servicing.

(2) Release the quick release fasteners securing the panel and hinge the panel down to its full extent.

(3) Remove the electroluminescent panel (Ref.33-16-00) to permit access to the magnetic indicator securing screws.

B. Remove Magnetic Indicator

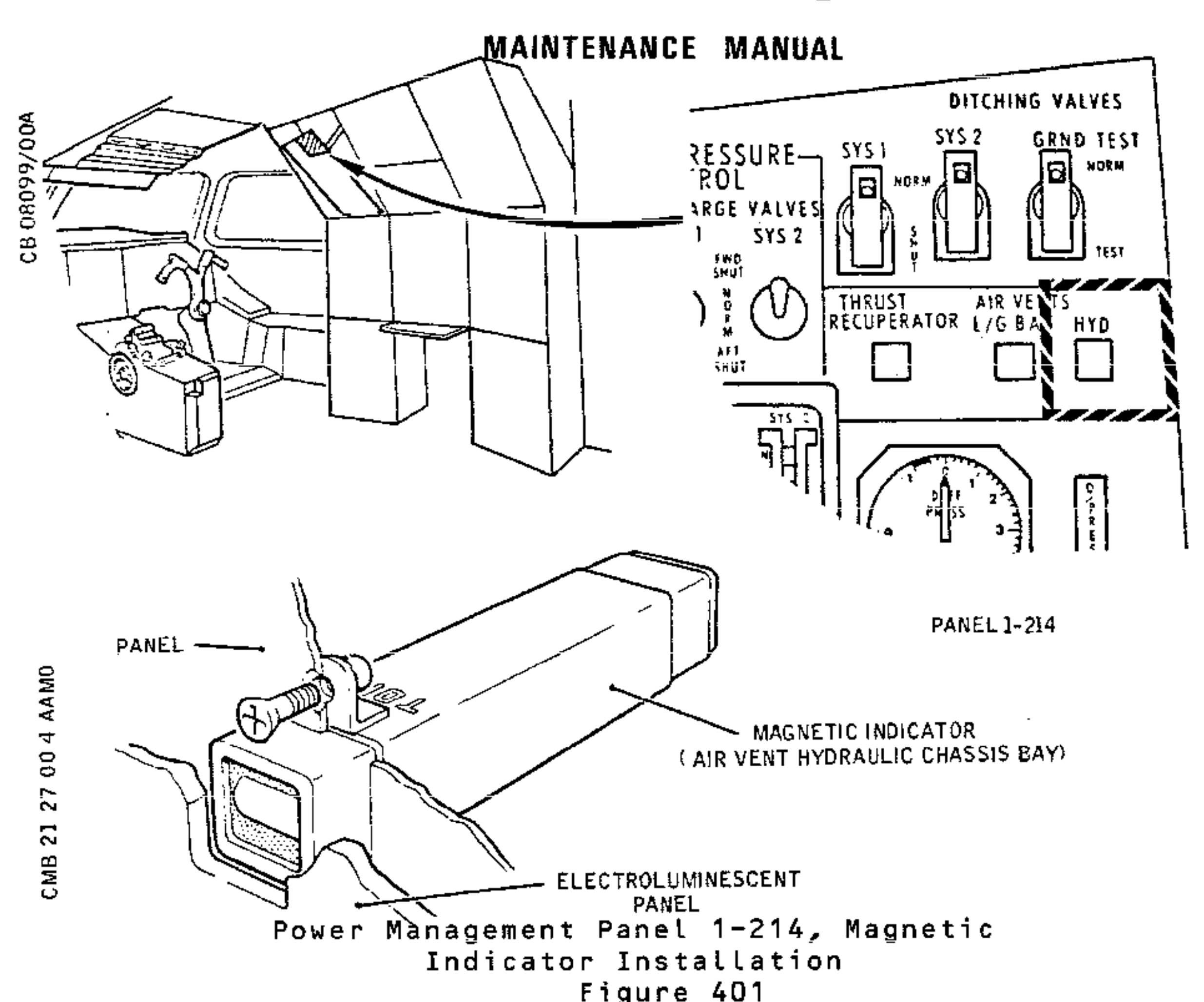
(1) Using a suitable tool withdraw the pin inserts from the back of the indicator in accordance with the Wiring Diagram Manual, 20-42-18.

(2) Remove the screws securing the indicator and withdraw the indicator from the back of the panel.

C. Install Magnetic Indicator

(1) Comply with the electrical safety precautions.

(2) Assemble the indicator to the back of the panel, ensuring that the word 'TOP' on the indicator coincides with the white line painted on the back of the panel, and secure it with two screws.



Power Management Panel 1-214, Magnetic Indicator Installation
R Figure 401

(3) Using a suitable insertion tool insert the electrical cables in the sockets in the rear of the indicator ensuring that the connections are made in accordance with the cable identifications and the applicable wiring diagram. Insert filler plugs in the unused sockets.

D. Conclude Installation

(1) Refit the electroluminescent panel to the control panel with the four bolts and electrically connecting and testing the luminescent panel in accordance with the instructions in 33-16-00.

(2) Close the panel and secure it with the fasteners.

(3) Cancel the electrical safety precautions and function test the forward equipment (hydraulic chassis) compartment ventilation system (Ref. 21-27-00, Adjustment/Test).

FORWARD EQUIPMENT (HYDRAULIC CHASSIS) COMPARTMENT VENTILATION - ADJUSTMENT/TEST

1. General (Ref. Fig. 501)

The chassis ventilated area is located under the flight compartment floor, and access to the area and to the pressure switch in the forward equipment bay is by removing an access panel and opening an access door in the underside of the fuselage beneath the flight compartment. The vent valve is controlled by a barometric switch which is set to close the valve if the cabin altitude should reach 11,000 feet. Indication of valve position is by a HYD magnetic indicator on the cabin pressure control panel
R at the 3 CM station, and a visual indicator on the side of the valve.

2. Functional Test (Ref. Fig. 501)

A. Equipment and Materials

R
R
R
R
R
R
R

DESCRIPTION	PART NO.
Negative pressure rig (Depression of 10 psi (684 mb))	-

B. Prepare to Test

(1) Make available electrical ground power (Ref. 24-41-00).

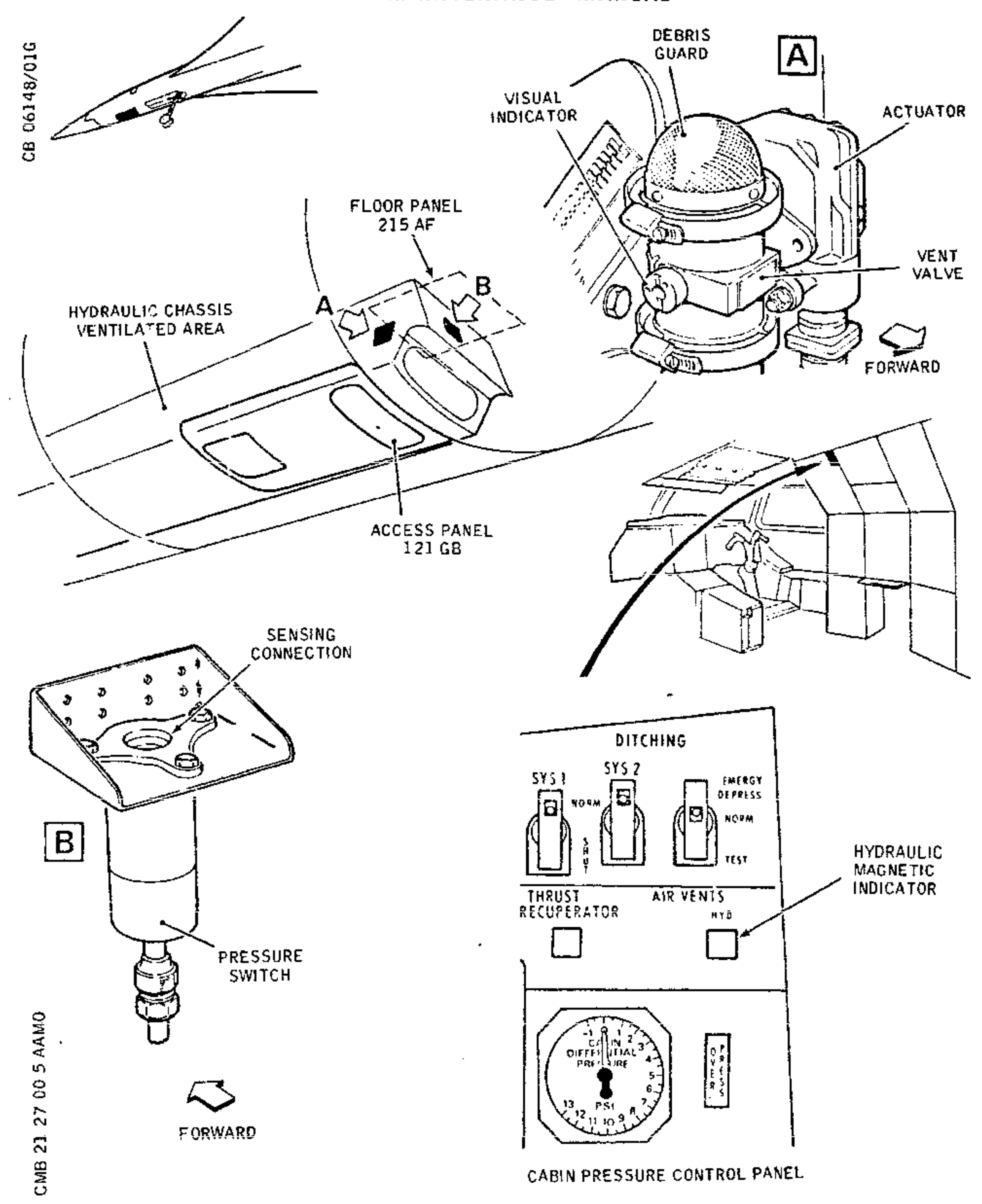
(2) Remove access panel 121 GB to gain access to the vent valve and remove floor panel 215 AF between the forward electronics racks to gain access to the pressure switch.

NOTE: The door hinges inwards and is secured in the open position by a latch.

C. Test

(1) Check that the visual indicator on the side of the valve shows OPEN and that the HYD magnetic indicator shows OPEN.

(2) Connect the negative pressure rig to the sensing connection of the pressure switch in the forward equipment bay.



R Hydraulic Chassis Ventilation - Adjustment/Test
Figure 501

(3) Switch on the rig to obtain a negative pressure on the pressure switch sensing connection, and check the visual indicator on the side of the vent valve to ensure that the valve closes at a negative pressure of not more than 5.5 psig (0.37 bars) below ambient. Check that the HYD magnetic indicator shows SHUT.

(4) Switch off the negative pressure rig and allow the negative pressure to decay; check the visual indicator on the side of the vent valve re-opens at a negative pressure of not less than 3.8 psig (0.26 bars) below ambient. Check that the HYD magnetic indicator shows OPEN.

D. Conclusion

(1) Disconnect the negative pressure rig.

(2) Fit access panel 121 GB and release the latch. Refit floor panel 215 AF.

(3) Switch off and disconnect electrical ground power (Ref. 24-41-00).

FORWARD EQUIPMENT (HYDRAULIC CHASSIS) COMPARTMENT VENTILATION - APPROVED REPAIRS

1. General

There are three segregation panels containing curtains of viton coated Nomex, which, together with a loom should form a ventilated compartment around the hydraulic chassis.

Tears and punctures in the membranes are repaired in situ, using patches of viton proofed Nomex fabric and adhesive. Temporary or permanent repairs may be performed on the membrane.

2. Vapour Seal Membrane Repair Using Adhesive EC 1099 (Ref. Fig. 801)

A. Equipment and Materials

DESCRIPTION	PART NO.
R R Viton proofed Nomex fabric (Ref.20-30-00, No. 160)	-
Adhesive EC 1099 (Ref.20-30-00, No.312)	-
Solvent Methylethylketone (Ref.20-30-00, No.470).	-
Fine brush	-
Scraper	-
Scissors	-

B. Prepare

(1) Remove or move aside the insulation blanket covering the section of the membrance to be repaired.

CAUTION: CARE MUST BE TAKEN TO ENSURE THAT THE INSULATION BLANKETS ARE NOT CRUSHED OR DAMAGED.

C. Repair

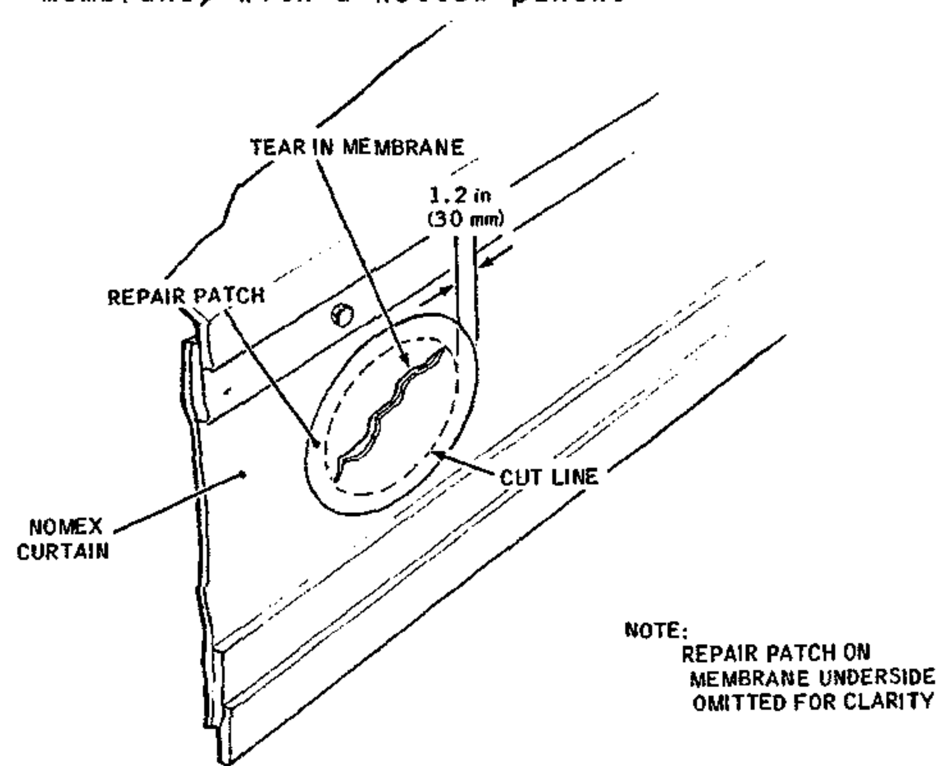
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WARNING: THE ADHESIVE CONTAINS A VOLATILE AND FLAMMABLE SOLVENT, THEREFORE THE REPAIR AREA MUST BE WELL VENTILATED AND AWAY FROM NAKED LIGHTS.

(1) Mark the area to be repaired on the membrane, to conform with the dimensions shown in (Ref. Fig. 801). Cut a regular hole, without corners, around the tear using scissors; remove excess fabric.

R (2) Prepare a viton proofed Nomex fabric patch to cover the marked area. Make any necessary attachment holes in the patch, to align with those in the membrane, with a hollow punch.

CB 07845/00A



CMB 21 27 00 8 AAM0

Nomex Curtain - Approved Repairs
Figure 801

(3) Clean the area of the membrane to be covered by the repair patch, and the patch itself, with methyl-ethylketone. Dry the surfaces, and ensure that no traces of grease or oil remain.

(4) Apply the patch.

NOTE: EC 1099 adhesive must be used in accordance with the instructions contained in 20-25-13.

(a) Spread a thin coat of adhesive over the repair
R area and the mating surface of the patch and
R allow to dry for approximately 40 minutes.

R (b) Apply a second coat of the adhesive and allow to
R become dry to the touch (approximately 10 to
R 15 minutes).

(c) Position the repair patch on the membrane, and press it down firmly to ensure a good contact at all points.

(d) If the edge of the patch does not stick or if the patch has to be peeled off for any reason, the adhesive will be faulty. The patch must then be removed, the adhesive removed from the surfaces, and surface thoroughly cleaned. Re-apply the adhesive and repeat the repair sequence.

(5) Allow the repair to cure for four hours.

3. Vapour Seal Membrane - Repair Using Superflexit 707 (Ref. Fig. 801)

A. Equipment and Materials

DESCRIPTION	PART NO.
Viton proofed Nomex fabric (Ref.20-30-00, No. 160)	-
Adhesive, Superflexit 707 (Ref. 20-30-00, No. 329). Life, six months at -20 deg C	-
Hardener, Superflexit R (Ref. 20-30-00, No. 330). Life, six months at -20 deg C	-
Solvent Methylethylketone (Ref.20-30-00, No.470)	-
Fine brush	-
Scraper	-

DESCRIPTION	PART NO.
Scissors	-
Gloves and goggles	-
Fine grade sandpaper	-

B. Prepare

(1) Remove or move aside the insulation blanket covering the section of the membrane to be repaired.

CAUTION: CARE MUST BE TAKEN TO ENSURE THAT THE INSULATION BLANKETS ARE NOT CRUSHED OR DAMAGED.

C. Repair

WARNING: THE ADHESIVE CONTAINS A VOLATILE AND FLAMMABLE SOLVENT, THEREFORE THE REPAIR AREA MUST BE WILL VENTILATED AND AWAY FROM NAKED LIGHTS.

KEEP THE HARDENER AND SOLVENT AWAY FROM SKIN, EYES, AND RESPIRATORY TRACTS.

(1) Mark the area to be repaired on the membrane, to conform with the dimensions shown in (Ref. Fig. 801). Cut a regular hole, without corners, around the tear using scissors; remove excess fabric.

(2) Prepare two viton proofed Nomex fabric patches to cover the marked area. Make any necessary holes in the patches, to align with those in the membrane, with a hollow punch.

(3) Thoroughly mix the hardener and the adhesive in a ratio of five parts hardener to 100 parts of adhesive.

(4) Clean the area of the membrane to be covered by the repair patches, and the patches themselves, with methylethylketone. Lightly abrade the surfaces with fine grade sandpaper. Clean the surfaces with methylethylketone, dry them, and ensure that no traces of grease or oil remain.

CAUTION: ONCE MIXED THE ADHESIVE MAY BE USED DURING A TWO HOUR PERIOD ONLY.

(5) Apply the two prepared patches.

(a) Spread a thin coat of adhesive over each side of the repair area and on the mating surfaces of each patch. Apply a liberal coat of adhesive around the edge of the repair.

(b) Allow the adhesive to dry for 10 minutes.

(c) Apply a second coat of adhesive over the repair area and the patches.

(d) Allow the adhesive to dry until it is no longer sticky to the touch, then apply the patches, one side of the repair area. Press the patches together firmly, working progressively outwards from the centre to remove all air bubbles.

(e) Blend the nearest patch with membrane by applying several coats of adhesive to the edge of the patch and the surrounding area.

NOTE: If the edge of the patch does not stick or if the patch has to be peeled off for any reason, the surfaces must be re-coated with adhesive, as in previous operations, and the repair sequence repeated.

(6) Allow the repair to cure for 48 hours.

PRESSURE SWITCH - REMOVAL/INSTALLATION

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED IN 24-00-00.

1. General

The pressure switch is secured to a bracket, which is fixed to the rear panel of the forward hydraulic bay. Access is gained from inside the aircraft by removal of the floor panel. (Ref. Fig. 401).

2. Pressure Switch - Removal/Installation

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit breaker safety clip	-
Lamp - explosion proof	-
Torque spanner (0-50 lbf in 0-0.565 mdaN range)	-

B. Prepare to Remove Pressure Switch

(1) Electrically isolate the pressure switch circuit by tripping circuit breaker H 1928 on panel 15-215, map ref. G2. Fit a safety clip.

(2) Gain access to the pressure switch by removing floor panel 215 AF.

C. Remove Pressure Switch

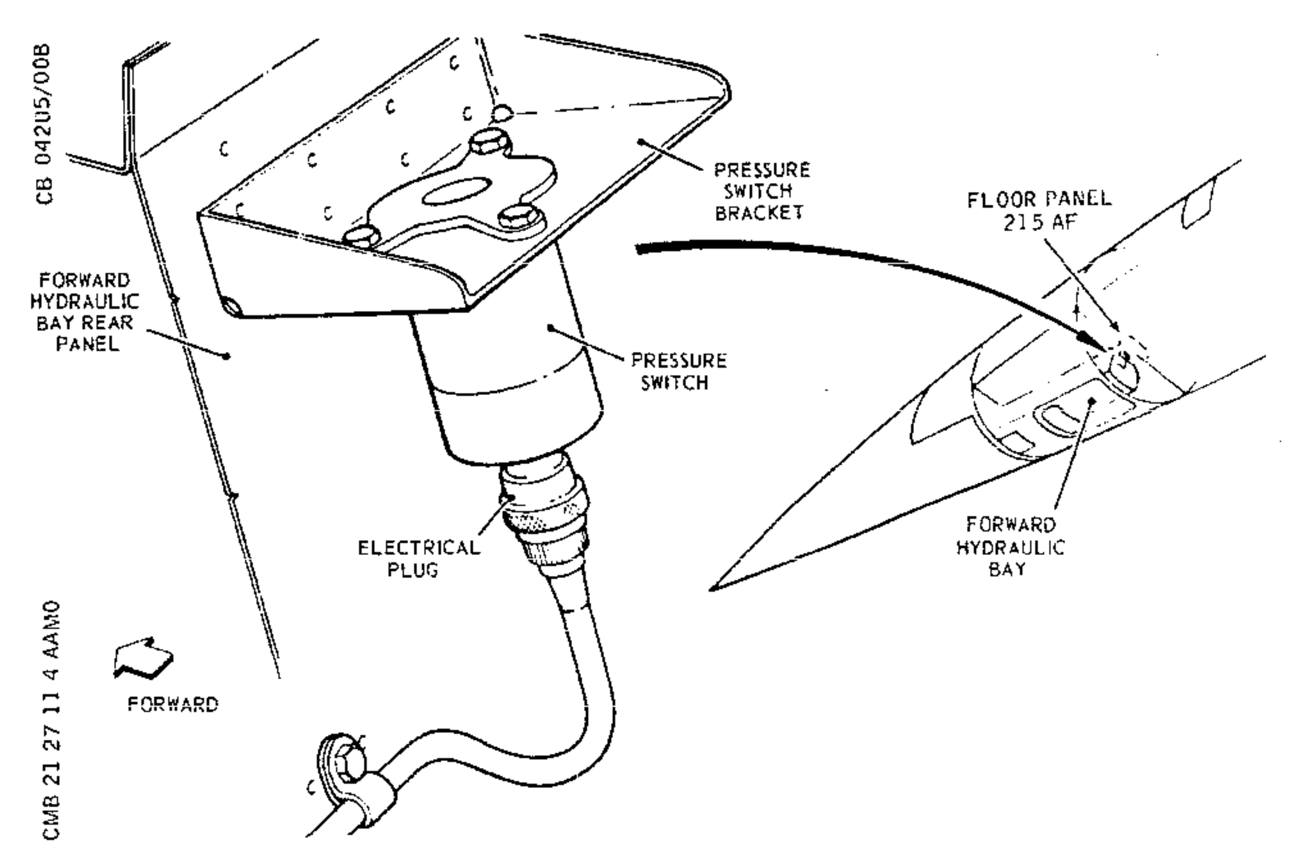
(1) Disconnect the electrical plug from the pressure switch.

(2) Remove the three screws securing the pressure switch to the bracket. Remove the switch.

D. Install Pressure Switch

(1) Comply with the electrical safety precautions.

(2) Position the pressure switch in the bracket, and align



- Pressure Switch - Installation
R Figure 401

the screw holes in the switch flange with the nut plates on the bracket.

(3) Secure the pressure switch to the bracket with three screws. Torque load each screw to between 40 and 45 lbf in (0.452 - 0.508 mdaN).

(4) Ensure that the electrical plug and receptacle are clean and undamaged; connect the plug to the pressure switch.

R (5) Remove the safety clip and set circuit breaker
R H1928 on panel 15-215 map ref G2.

(6) Function test the forward equipment compartment ventilation system (Ref. 21-27-00, Adjustment/Test).

R (7) Fit the floor panel.

VENT VALVE - REMOVAL/INSTALLATION

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED IN 24-00-00.

1. General

The vent valve is located at the rear of the forward hydraulic bay on the left hand side, and is clamped to the vent pipe which protrudes into the bay from the rear panel. Access is gained from outside the aircraft by removal of the access panel. (Ref. Fig. 401)

2. Vent Valve - Removal/Installation

A. Equipment and Materials

R
R
R
R
R
R
R
R
R

DESCRIPTION	PART NO.
Circuit breaker safety clips	-
Lamp - explosion proof	-

B. Prepare to Remove Vent Valve

(1) Electrically isolate the valve circuit by tripping circuit breaker H 1928 on panel 15-215, map ref.G2. Fit a safety clip.

(2) Gain access to the valve by removing panel 121GB.

C. Remove Vent Valve

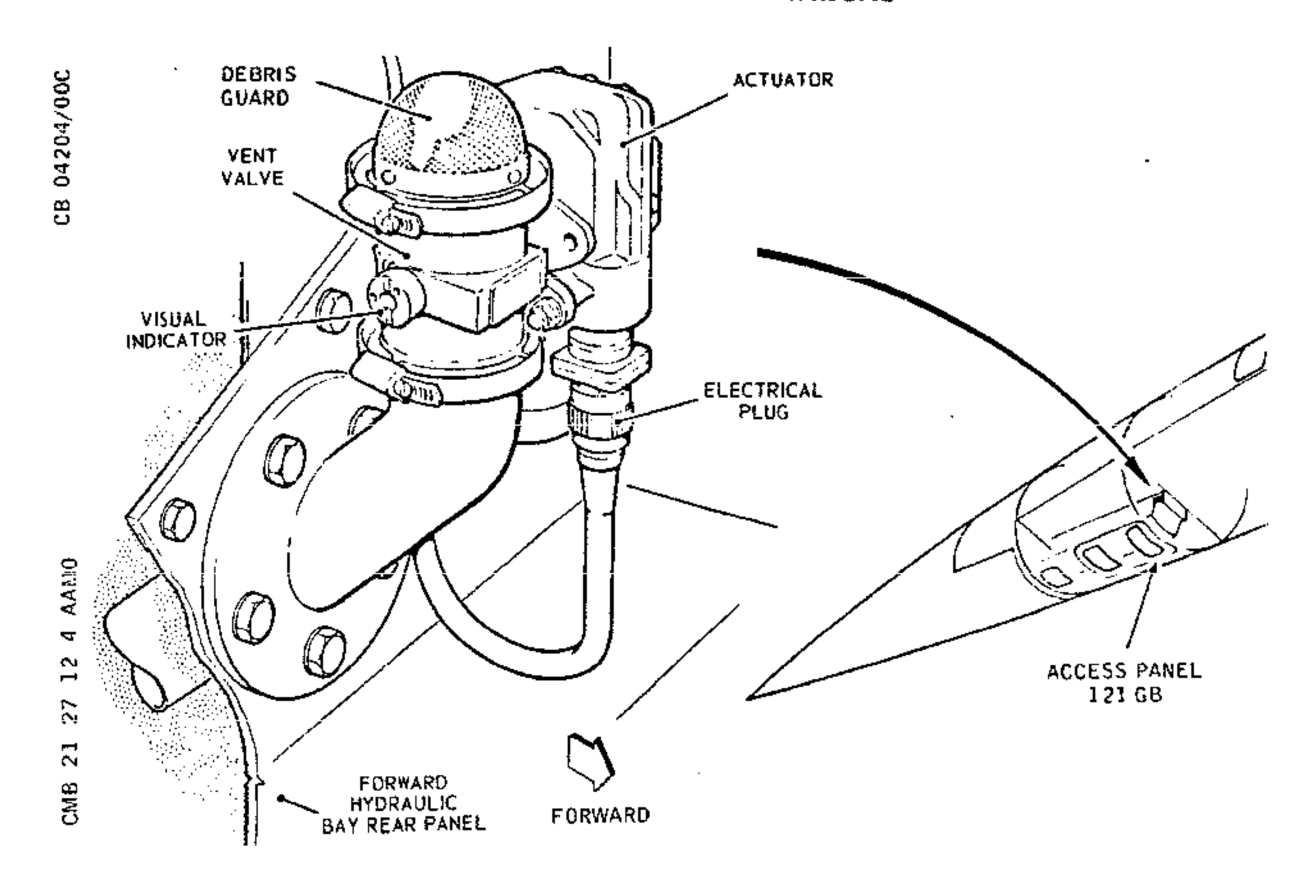
(1) Disconnect the electrical plug from the valve actuator.

(2) Support the valve and remove the clamp securing the valve to the vent pipe.

(3) Remove the valve and O-ring seal; discard the seal.

(4) Fit a suitable blank cover over the open end of the vent pipe.

D. Install Vent Valve



Vent Valve - Installation
Figure 401

(1) Comply with the electrical safety precautions.

(2) Remove the blank from the vent pipe, and ensure that the pipe is clear of debris.

(3) Fit a new O-ring seal to the flange of the vent pipe.

(4) Visually inspect the valve for freedom from damage.

(5) Position and support the valve, with the direction of flow arrow pointing down, and the visual indicator pointing toward the centre line of the aircraft.

(6) Secure the valve to the vent pipe with the clamp.

(7) Ensure that the electrical plug and receptacle are clean and undamaged; connect the plug to the valve actuator.

(8) Remove the safety clip and set circuit breaker

H1928 on panel 15-215, map ref G2.

R **ON A/C 001-006,
B (9) Deleted.

(10) Fit the access panel.

R **ON A/C 007-007,

(9) Function test the valve, (Ref.21-27-00, Adjustment/-Test).

(10) Fit the access panel.

WING REAR EQUIPMENT COMPARTMENT VENTILATION AND OVERHEAT DETECTION - DESCRIPTION AND OPERATION

1. General (Ref. Fig. 001)

The wing rear equipment compartment, in each wing is ventilated by an air change system air bleed to prevent overheating. Should overheating occur, a detection system provides visual and audio indication in the flight compartment when the temperature exceeds a predetermined limit.

For ventilation purposes, the compartment in each wing is divided in two groups each containing various items of equipment including the cold air units (CAU). Groups 1 and 2 are in the left-hand wing and groups 3 and 4 in the right-hand wing. The ventilating air-bleed, taken from the input duct on each CAU, is conducted by pipes to strategic areas of the compartment where the air is discharged for ventilation. Due to the continuous output from an operating CAU, the ventilating air flows rearward where it is emitted overboard through structural apertures in the rear spar on each side of the twin secondary nozzle.

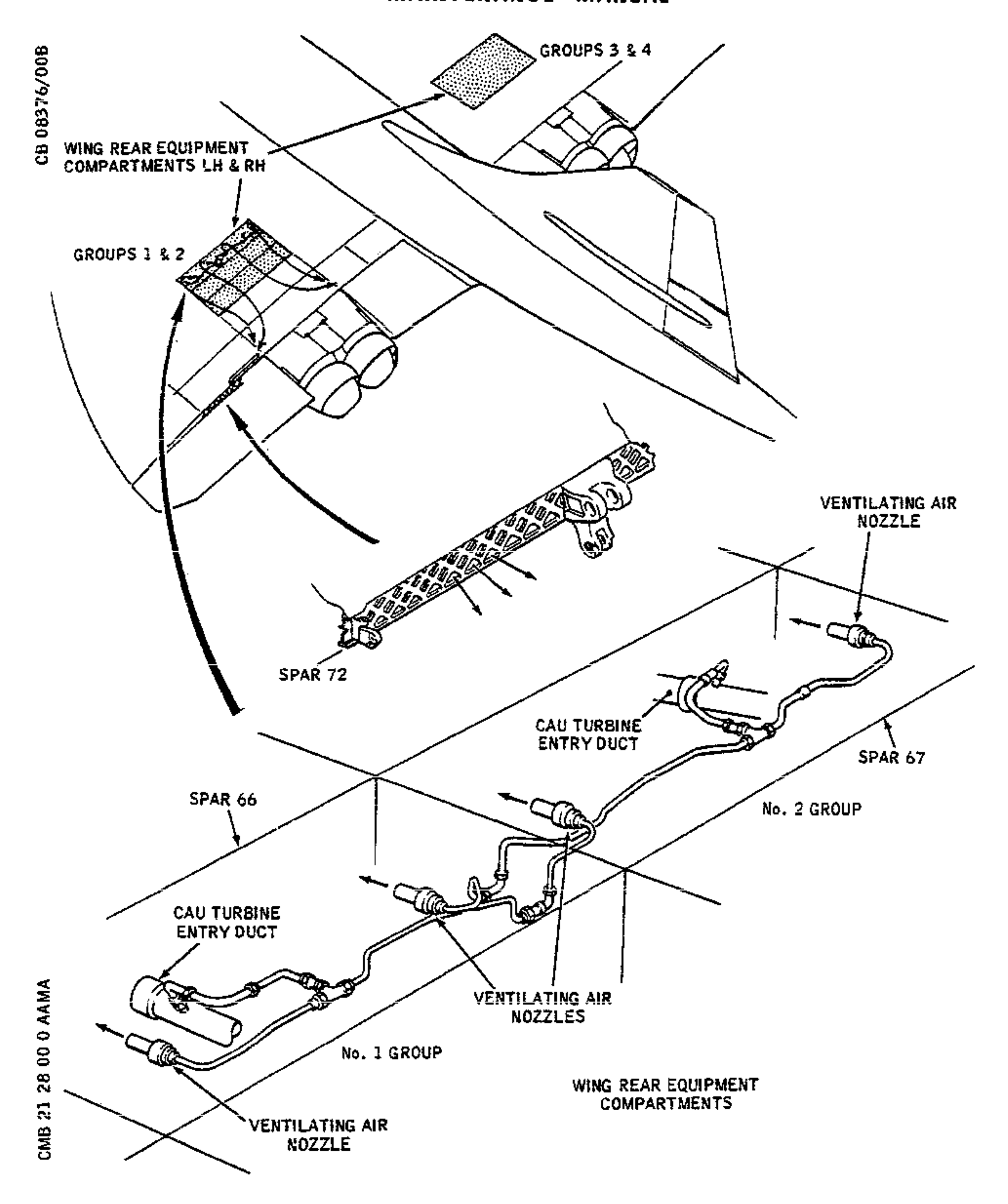
The overheat system provides continuous monitoring of the compartment air temperature, which can be affected by the escape of hot air from the air conditioning and engine anti-icing systems or by fire. The system, installed primarily for structural protection, consists of four thermoswitches, in each wing compartment, arranged so that there are two located above each engine. Each pair of thermoswitches is connected to an amber warning caption, at the third area members panel, to indicate a rise in air temperature above 175 deg C (347 deg F). Operation of the caption also operates the associated master warning ENG caption and an audio gong (Ref.33-15-00). The captions are also utilized by the nacelle overheat detection system (Ref. 26-12-00).

2. Ventilation Pipes (Ref. Fig. 001)

The ventilation air bleed is conveyed, by a small-bore pipe from group 1 CAU, to a T-branch where it passes to two ventilating air nozzles, one located in each of the group 1 and 2 areas. A similar pipe system is routed from the CAU in group 2 so that ventilating air will continue to flow in the event of one CAU failure. An identical arrangement of pipes is installed in the right-hand wing which receives ventilating air from the group 3 and 4 CAUS's.

3. Thermoswitches (Ref. Fig. 002)

There are eight thermoswitches, two located above each engine



Wing Rear Equipment Compartment Ventilation
and Overheat Detection (Sheet 1 of 2)
Figure 001

R

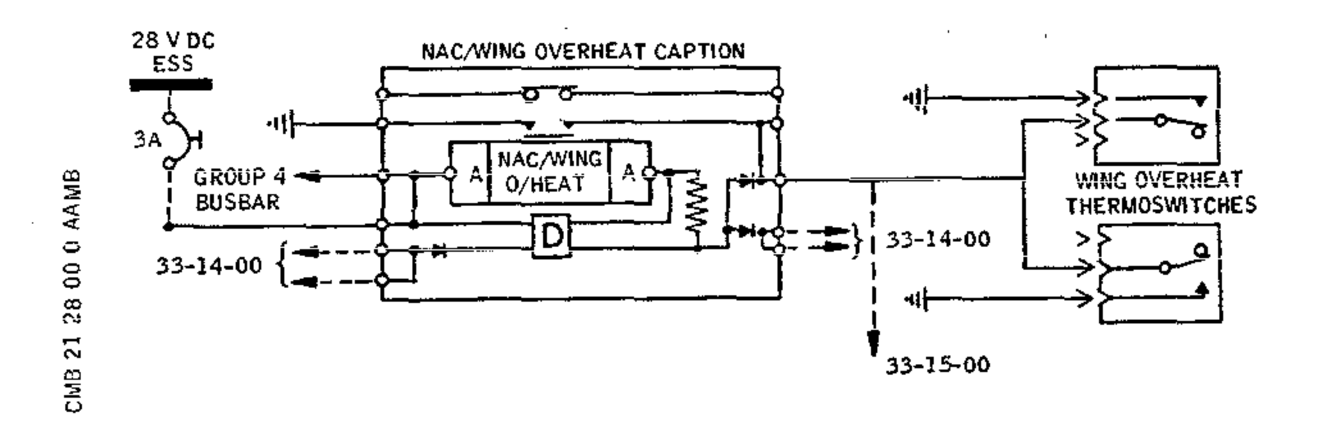
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ENGINE O/HEAT	ENGINE O/HEAT	ENGINE O/HEAT	ENGINE O/HEAT
START PUMP	START PUMP	START PUMP	START PUMP
WIND DOWN	WIND DOWN	WIND DOWN	WIND DOWN
REHEAT	REHEAT	REHEAT	REHEAT
NAC/WING O/HEAT	NAC/WING O/HEAT	NAC/WING O/HEAT	NAC/WING O/HEAT
FUEL FILTER	FUEL FILTER	FUEL FILTER	FUEL FILTER

OVERHEAT CAPTIONS 3 CM STATION

MASTER WARNING CAPTIONS

M/CG	ENG 1	ENG 2	ENG 3	ENG 4	THRO
CG	ENG 1	ENG 2	ENG 3	ENG 4	FUEL
AIR	INT 1	INT 2	INT 3	INT 4	HYD
	INT 1	INT 2	INT 3	INT 4	



Wing Rear Equipment compartment Ventilation
and Overheat Detection (Sheet 2 of 2)
Figure 001

bolted to brackets in the compartment, and accessible from various access panels on the wing top surface. Each thermoswitch consists of a flanged steel body, to which is welded a temperature sensitive cylinderical tube, with a three-pin electrical connected on the flanged body. The electrical connector is keyed to ensure correct electrical connections are made during installation.

4. Operation

A. Ventilation

Operation of either of the two CAU's in each wing causes air to be introduced into the compartment for ventilation purposes and to be emitted overboard at the rear spar area.

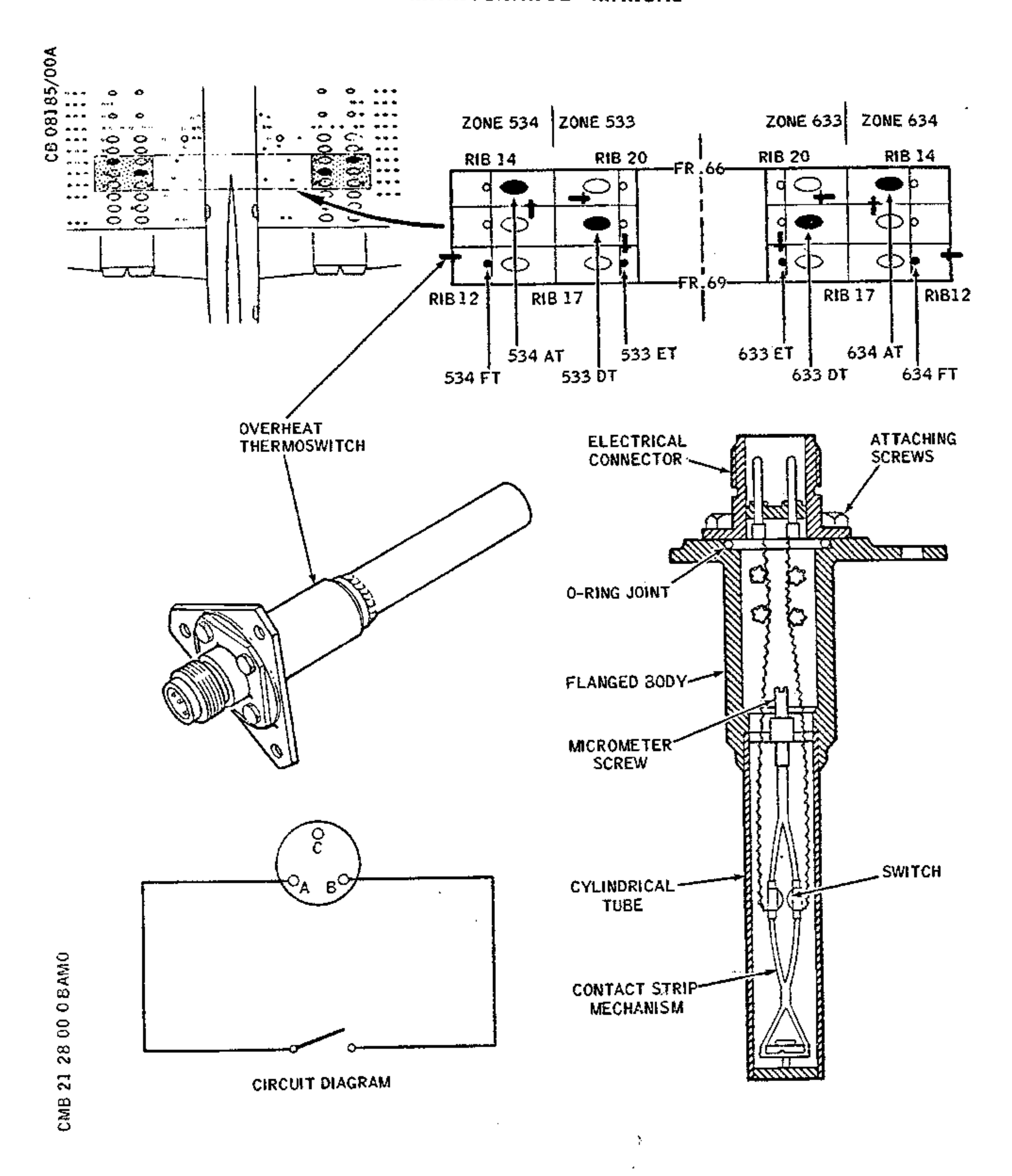
B. Overheat Detection

An increase in the compartment air temperature above each engine causes the temperature sensitive cylindrical tube to expand. The change in length of the tube is amplified by the contact strip mechanism causing the electrical circuit in the thermoswitch to close.

Closing of the thermoswitch illuminates the corresponding NAC/WING O/HEAT amber warning caption on panel 1-214 at the third crew members station. Simultaneously, the corresponding amber warning caption on the pilots roof panel 4-211 is also illuminated and the master warning gong sounds (Ref. 33-15-00). The ENG master warning caption may be cancelled by pressing the caption, but the NAC/WING O/HEAT caption remains illuminated as long as the overheat condition exists.

5. Power Supply

The power supply is taken from the 28V d.c. essential busbar Groups 1 and 4 are supplied through circuit breaker W128 on panel 1-213 and groups 2 and 3 through circuit breaker W129 on panel 5-213.



Thermoswitch
Figure 002

R WING REAR EQUIPMENT COMPARTMENT VENTILATION AND OVERHEAT DETECTION - ADJUSTMENT/TEST

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS IN 24-00-00.

1. General (Ref. Fig. 501)

1 The overheat detection thermoswitch must be removed from the wing compartment for testing, but must remain within reach of its own electrical lead. The test is similar for all eight thermoswitches.

2. Functional Test - Overheat Detection (Ref. Fig. 502)

A. Equipment and Materials

DESCRIPTION	PART NO.
Ground power supply	-
Test Set	BE 101
Aircraft telephone extension	-
115v, 400 Hz extension cable	-

B. Prepare

(1) Make available electrical ground power (Ref.24-41-00).

(2) Place the test set near the appropriate access panel and establish telephone connection with the flight compartment.

R B (3) Rig the 115v, 400 HZ power supply cable Part No. is
R B 417280, using pins A and B of A/C test socket D116-A
R B on panel 18-216 of the RH forward racking in the flight
R B compartment.

(4) Remove the thermoswitch from the wing compartment (Ref.21-18-11, Removal/Installation).

(5) Connect the test set as shown in (Ref. Fig. 502) and insert the thermoswitch sensor in the heating block. Set the appropriate thermoswitch circuit breaker.
R B Thermoswitch to test set connection Part No. is 417278.
R B Test set to wing connection Part No. is 417279.

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
ENG 1 & 4 WING/NAC O/HEAT SYS SUP	1-213	W128	Q21
ENG 2 & 3 WING/NAC O/HEAT SYS SUP	5-213	W129	D18

C. Test

(1) (a) On test set, set main switch to MARCHE (ON), Green (power on) indicator light illuminates. Red CHAUFFAGE (heat on) indicator light illuminates.

(b) Set Rheostat control to 0 (max.heat) until temperature rises to half-way to T89.2C.F green band. Then turn rheostat control to approx. 80 position so that rate of approach to switch setting is more gradual.

(c) As the thermal switch operates, CHAUFFAGE indicator light goes off, AVION (overheating warning monitor) light illuminates. Check that this occurs within the T89.2C.F green band. Check simultaneously that the NAC/WING O/HEAT warning light on panel 1-214 at the 3CM station illuminates, the ENG amber master warning on roof panel 4-211 activates and the audio gong sounds.

(2) When the overheat warning monitor illuminates and the heating indicator cancels, check that the temperature indicator registers between 170 and 180 deg C. Check simultaneously that the NAC/WING O/HEAT warning light on panel 1-214 at the 3CM station illuminates, the ENG amber master warning on roof panel 4-211 activates and the audio gong sounds.

(3) Press the ENG master warning caption to cancel.

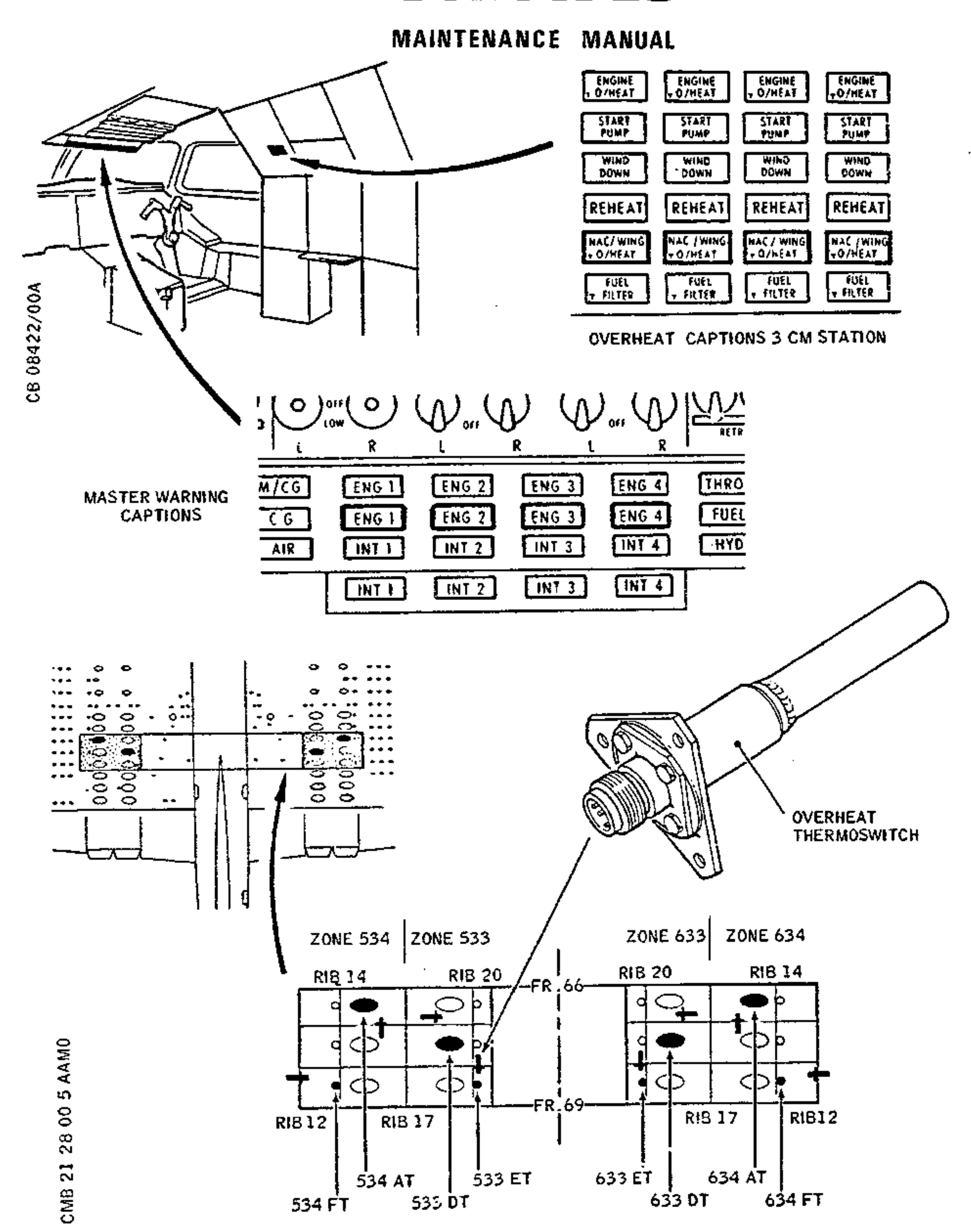
(4) Continue to monitor the temperature reading and check that on decreasing temperature, the overheat warning monitor cancels and the hearing indicator illuminates. Check simultaneously that the NAC/WING O/HEAT warning light at the 3CM station cancels.

(5) Repeat the cycle as necessary for a satisfactory test.

D. Conclusion

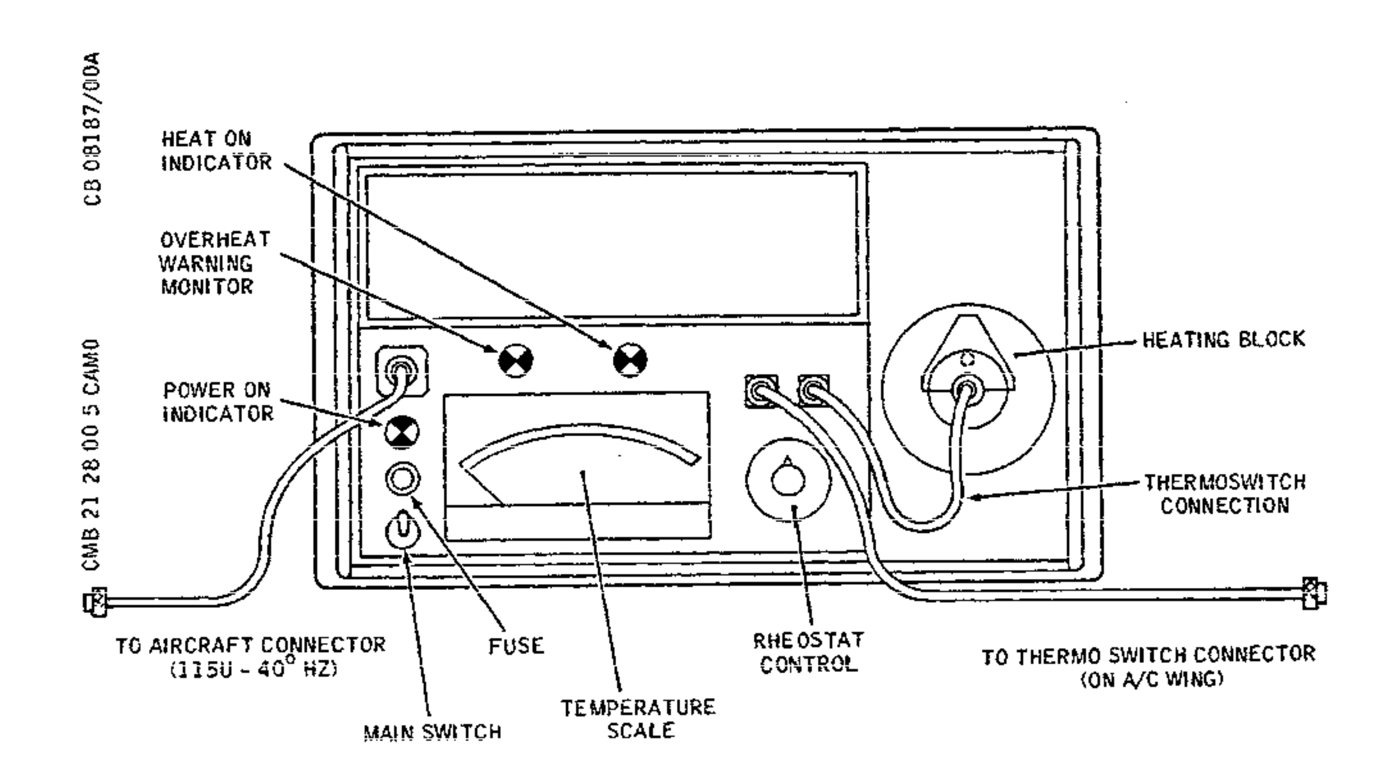
(1) Switch off by setting main switch to ARRET (OFF). Green light extinguishes. Disconnect the equipment.

(2) Refit the thermoswitch in the aircraft compartment and close up (Ref.21-28-11, Removal/Installation.



Overheat Detection - Adjustment/Test
Figure 501

R



R

Overheat Detection Test Set BE101
Figure 502

WING REAR EQUIPMENT COMPARTMENT VENTILATION AND OVERHEAT DETECTION - INSPECTION/CHECK

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS IN 24-00-00.

1. General (Ref. Fig.601 and 602)

   The exit of ventilating air from the rear wing equipment compartments is spread over a wide area of spar 72 and cannot be detected except by the use of smoke. This inspection/check introduces air at the engine ground air start connection and checks that a discharge is obtained from the ventilating nozzles in the wing compartments.

2. Wing Rear Equipment Compartment Ventilation

   A. Equipment and Materials

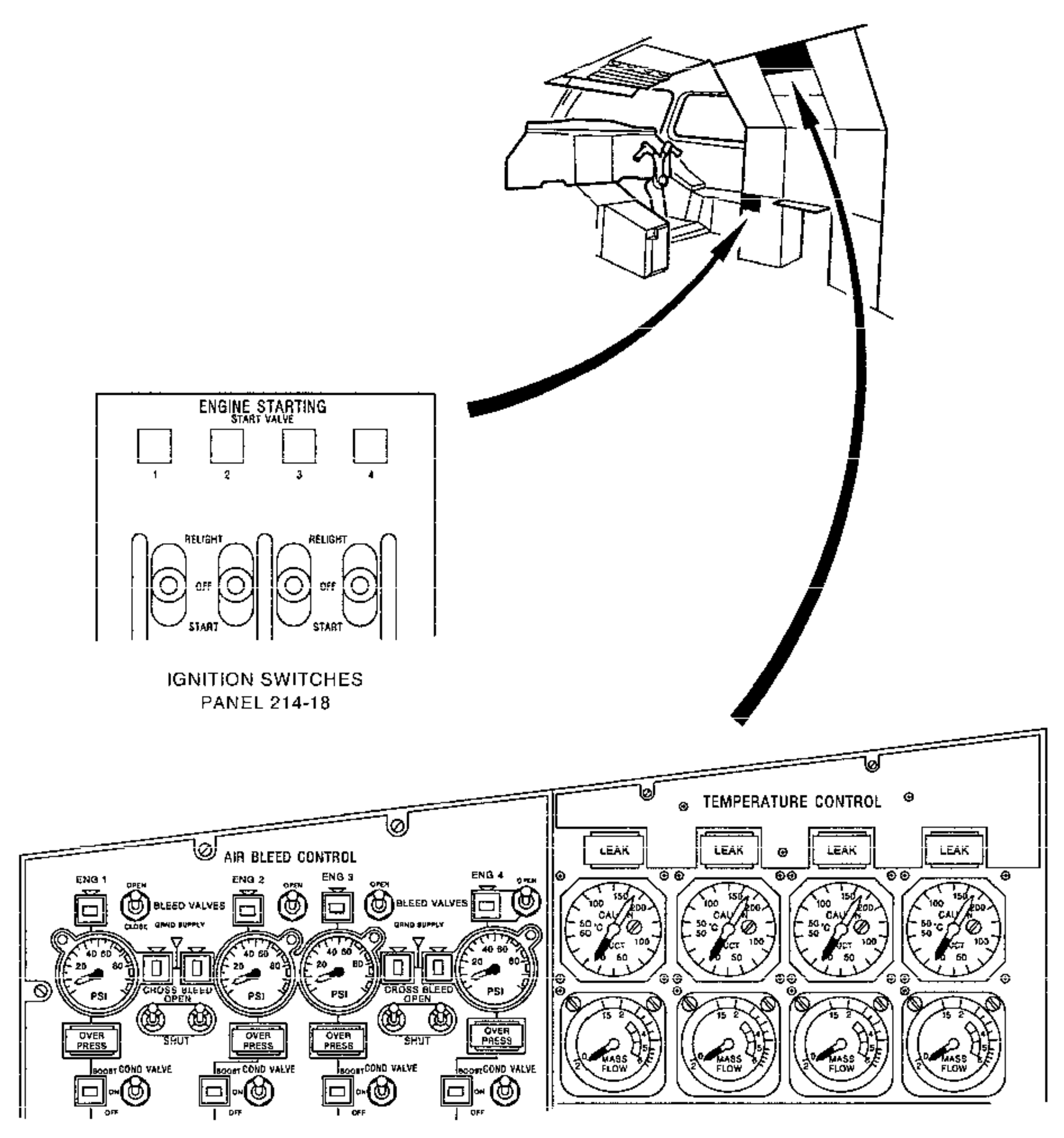
DESCRIPTION	PART NO.
Ground electrical power supply	-
Ground air supply unit (Ref.21-11-14, Adjustment/Test, with 3 in (76 mm) quick release coupling to SDM 322.	
Circuit breaker safety clips	-
Torque set spanner 70-80 lbf/in (0.791-0.904 mdaN)	-
Access panel key	E920132000
Wing access platform	-
Rubber mats	-

   B. Prepare

      (1) Open the appropriate wing access panels (Ref. Fig. 601):

         (a) Open circular panels 533AT, 534BT, 633AT, 634BT by removing the seven torque set screws and lifting the panel.

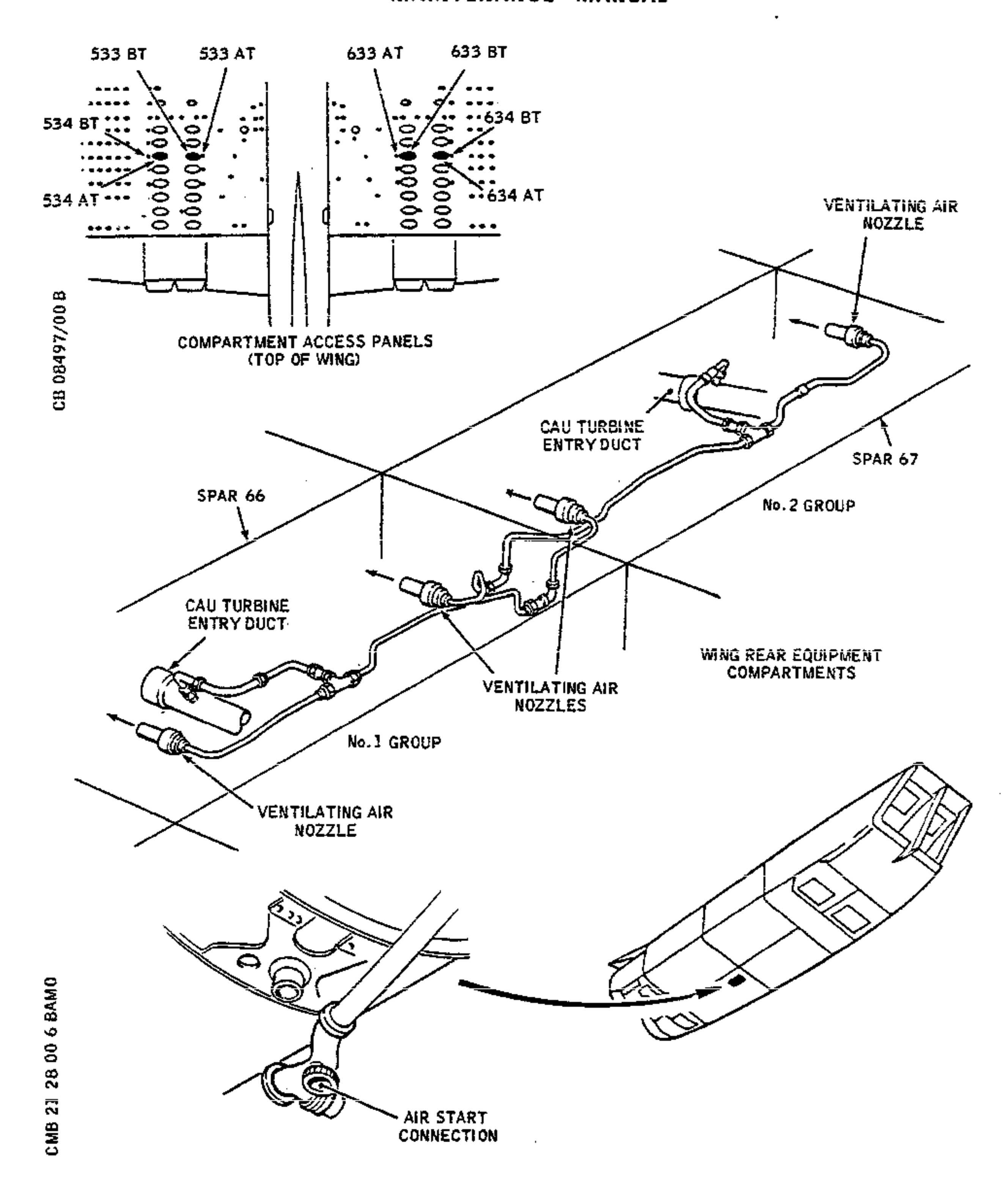
         (b) Open elliptical panels 533BT, 534AT, 633BT, 634AT by inserting the access panel key in each



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Wing Rear Equipment Compartment
Ventilation - Controls and Indication
Figure 601



Wing Rear Equipment Compartment
Ventilation
Figure 602

of the four latches in turn and pressing out from the centre.

(2) Make available electrical ground power. (Ref. 24-41-00).

(3) Check that the engine ignition switches on panel 18-214 at the 3CM station are at the "OFF" position and that the START VALVE magnetic indicators 1,2,3 and 4 display diagonal stripes.

(4) Electrically isolate the air start valves by tripping the circuit breakers listed below. Fit safety clips.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
ENG 1 & 4 AIR START CONT	15-215	K181	C15
ENG 2 & 3 AIR START CONT	15-216	K182	D11

(5) On panel 2-214 at the 3CM station, set the AIR BLEED CONTROL switches as follows at all four engine positions.

BLEED VALVES GRND SUPPLY	SHUT
CROSS BLEED	SHUT
COND VALVE	OFF

(6) Connect the ground air start rig to the LH side to test Groups 1 and 2 and to the RH side to test Groups 3 and 4.

(7) Pressurize the fuel system Ref. 28-00-00 and 21-11-14 (Adjustment/Test).

C. Check

(1) Operate the ground air supply unit.

(2) On the AIR BLEED CONTROL panel 2-214, select the required engine CROSS BLEED switch "OPEN" and COND VALVE switch "ON". Check that the COND VALVE MI displays vertical stripes and that the MASS FLOW indicator on the TEMPERATURE CONTROL panel shows a reading.

(3) Check by hand that there is a discharge of air in the

wing compartment from the two ventilating nozzles connected to the selected CAU.

(4) Select the CROSS BLEED switch "SHUT" and the COND VALVE switch "OFF" and check that the discharge of ventilating air in the wing compartment stops.

(5) Repeat operations (2),(3) and (4) on the other air conditioning groups as required.

(6) Switch off and disconnect the ground air start rig.

D. Conclusion

(1) Reset the circuit breakers previously tripped.

(2) Switch off and disconnect electrical ground power.

(3) Check that no loose articles are left in the wing compartments.

(4) Refit the access panels:

(a) Secure the circular panels with the seven captive screws and torque load evenly to 70-80 lbf/in (0.791-0.904 mdaN).

(b) Secure the elliptical panels by inserting the access panel key in each of the four catches in turn and pressing towards the centre of the panel.

OVERHEAT THERMOSWITCH - REMOVAL/INSTALLATION

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS IN 24-00-00.

1. General

There are two overheat thermoswitches in the wing dry compartments above each engine bay. Access is through the wing upper surface access panels in zones 533, 534, 633 and 634. The removal and installation procedure is similar for all eight thermoswitches.

2. Thermoswitches (Ref. Fig. 401)

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit breaker safety clips	-
R Torque set spanner 70-80 lbf/in (0.791-0.904 mdaN)	-
Access panel key	E920132000
Wing access platform	-
Rubber mats	-

B. Prepare

(1) Electrically isolate the thermoswitch by tripping the relevant circuit breaker listed below. Fit safety clip.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
ENG 1&4 WING/NAC O/HEAT SYS SUP	1-213	W128	Q21
ENG 2&3 WING/NAC O/HEAT SYS SUP	5-213	W129	D18

(2) Open the appropriate access panel (Ref. Fig. 401):

(a) Open the circular panel 533ET, 534FT, 633ET 634FT by removing the seven torque set screws and lifting the panel.

(b) Open the elliptical panel 534AT, 533DT, 634AT or 633DT by inserting the access panel key in each of the four catches in turn and pressing out from the centre.

C. Remove

(1) Disconnect the electrical connector from the thermoswitch.

(2) Undo the three bolts securing the thermoswitch to the mounting bracket.

(3) Remove the thermoswitch.

D. Install

(1) Ensure that electrical precautions taken prior to removal are complied with.

(2) Open the appropriate access panel.

R (3) Functionally test the overheat detection system (Ref. 21-28-00, Adjustment/Test).

(4) Secure the thermoswitch to the mounting bracket with the three washers and bolts. Torque load each bolt to 60-70 lbf/in (0.678-0.791 mdaN).

(5) Check that the electrical plug and receptacle are clean and undamaged; refit electrical connector.

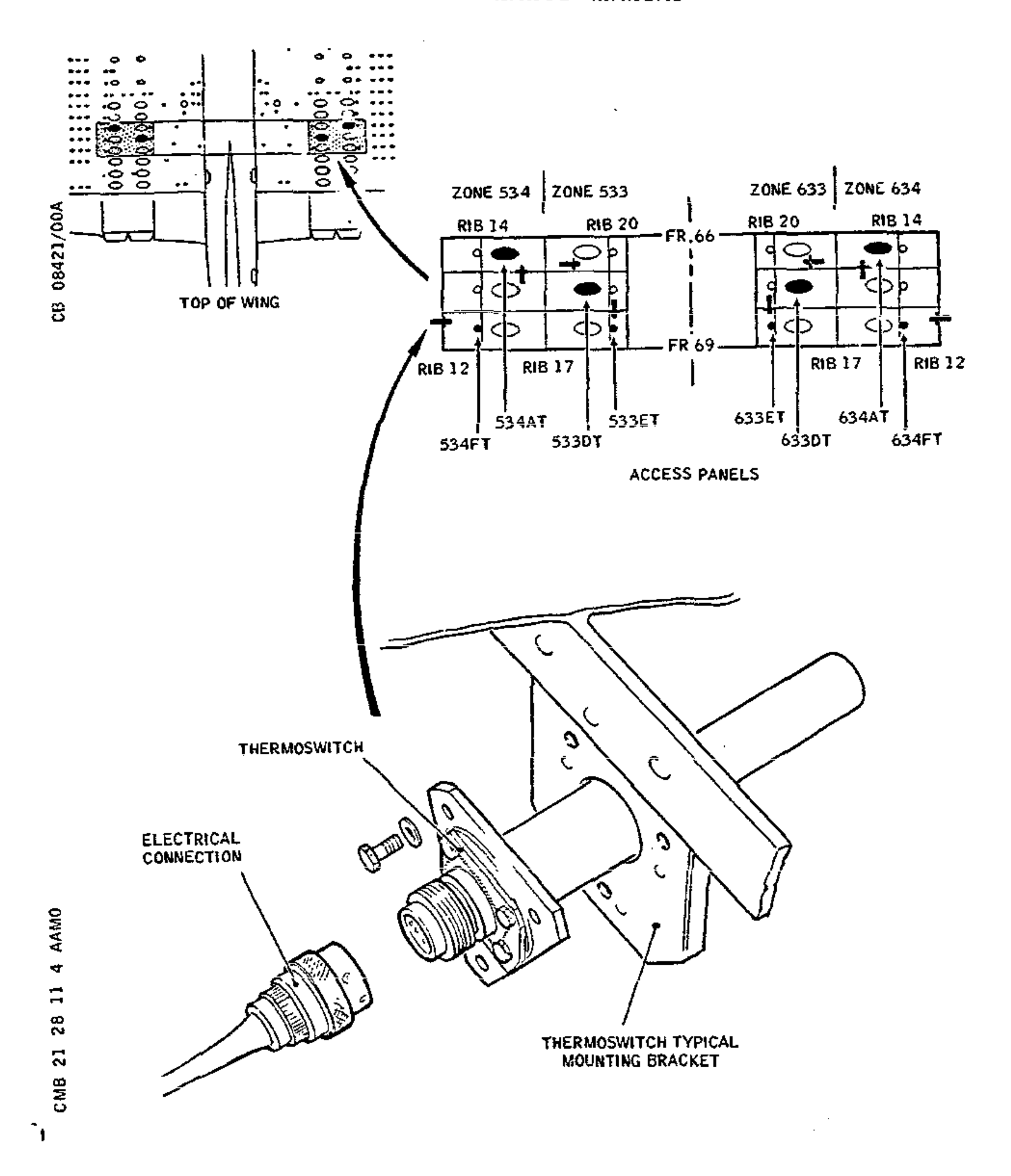
(6) Check that no loose material or tools are left in the compartment.

(7) Refit access panels:

(a) Secure the circular panel with the seven captive screws and torque load to 70-80 lbf/in (0.791-0.904 mdaN).

(b) Secure the elliptical panel by inserting the access panel key in each of the four catches in turn and pressing towards the centre of the panel.

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R

Overheat Thermoswitch - Installation
Figure 401

MISCELLANEOUS FUSELAGE AND WING COMPARTMENTS - VENTILATION - DESCRIPTION/OPERATION

1. General (Ref. Fig. 001)

Various below-floor and unpressurized compartments rearward of the main landing gear bay, also the wing equipment bay above each nacelle, are ventilated to dispel vapour, from adjoining fuel tanks, overboard. The ventilating air for those compartments in the fuselage is drawn from the landing gear ventilation system (Ref.21-34-00), while each wing equipment bay is ventilated by ram air received from a single intake in the outer elevon fairings.

2. Ventilation of Areas Enclosed by LH and RH! Underwing Fillets

The compartments between the fuselage and underwing fillets in zones 195 and 196, extend from the main landing gear bay to the rear hydraulic equipment bay. A light alloy pipe, from the right-hand side of the main landing gear bay ventilating air supply, is routed inside the keel to the rear of the main landing gear bay, where it branches right and left and connects with the underwing fillets on either side of the fuselage. The direction of air flow is from front to rear. Access to these pipes is through the main landing gear bay. The
in the Fuselage and Wing (Sheet 1 of 4)
in the Fuselage and Wing (Sheet 2 of 4)
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in the Fuselage and Wing (Sheet 4 of 4)

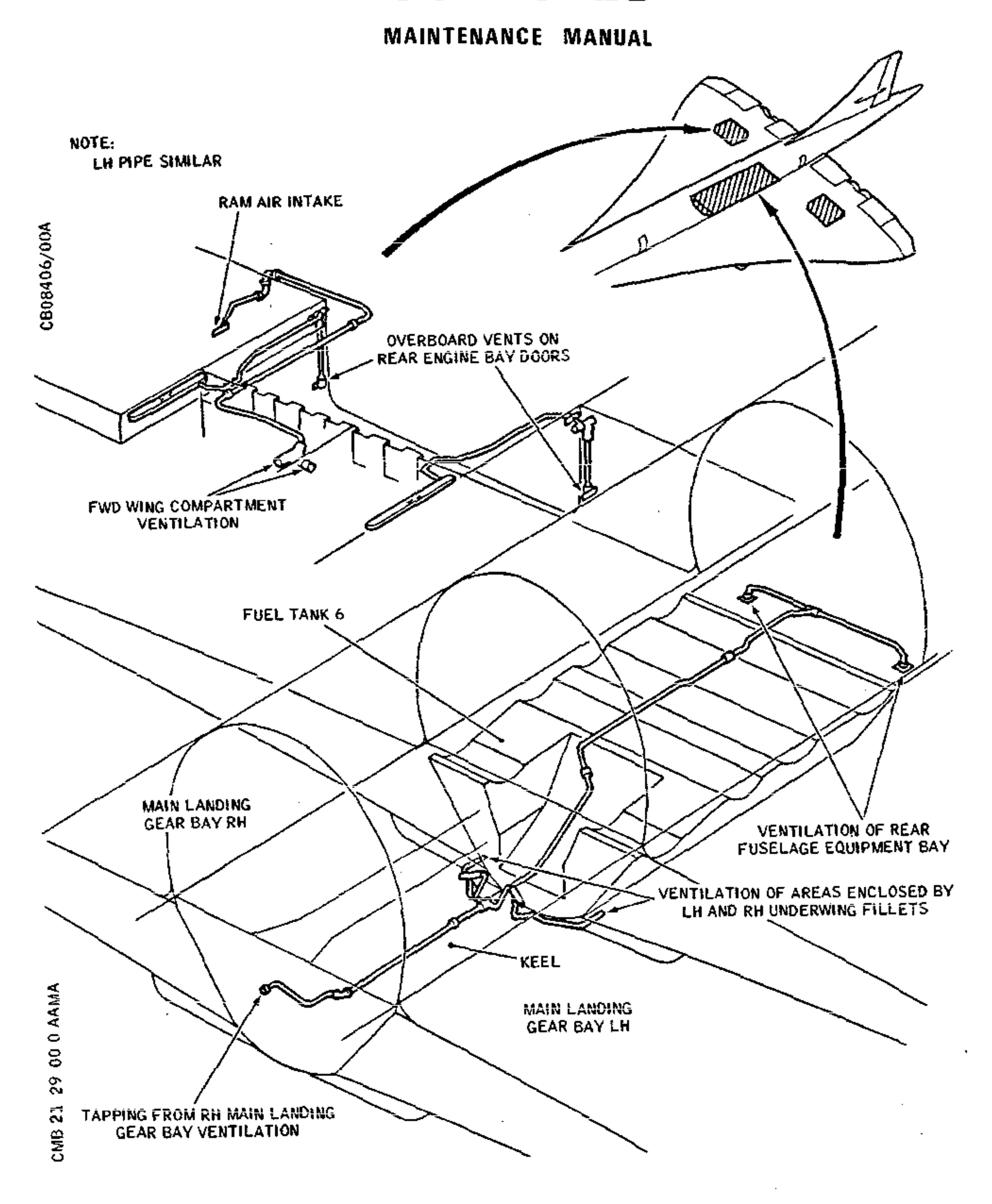
ventilating air is exhausted overboard through LH and RH outlets covered by rearward facing shrouds.

3. Rear Fuselage Equipment Bay Ventilation

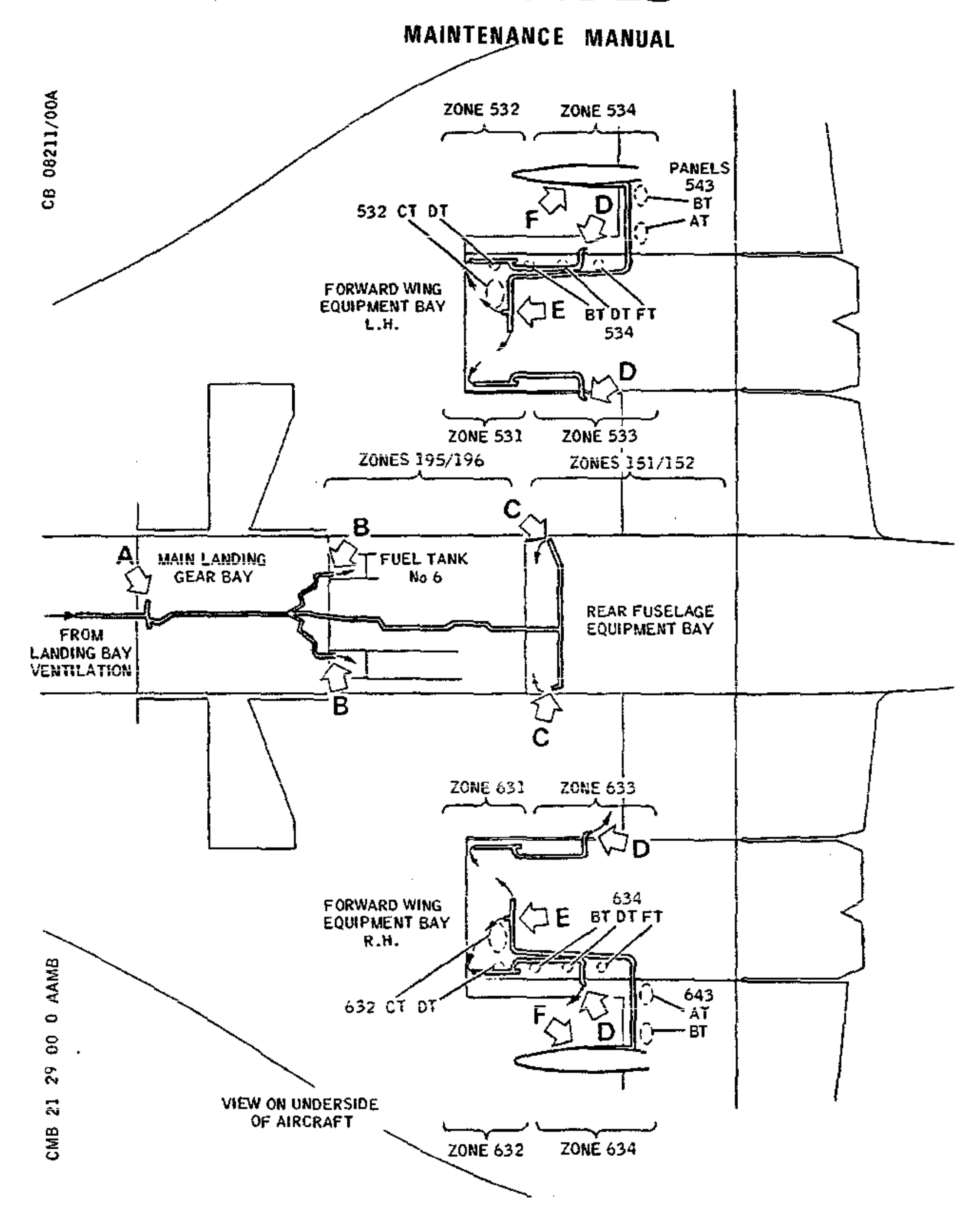
This compartment, in zones 151, 152, is separated from fuel tank No. 6 in front and the hydraulic equipment bay at the rear, by sealed bulkheads. The compartment contains the ground air conditioning connection, the air conditioning water separators, and a number of electrical services. A continuation of the ventilating air supply from the landing bay ventilation, passes up and over fuel tank No. 6 to the equipment bay, where it branches right and left and enters the bay through two skin fittings in the pressure floor beneath the passenger compartment.

NOTE: This pipe should not be confused with the fuel tank vapour seal ventilation pipe which runs beside it.

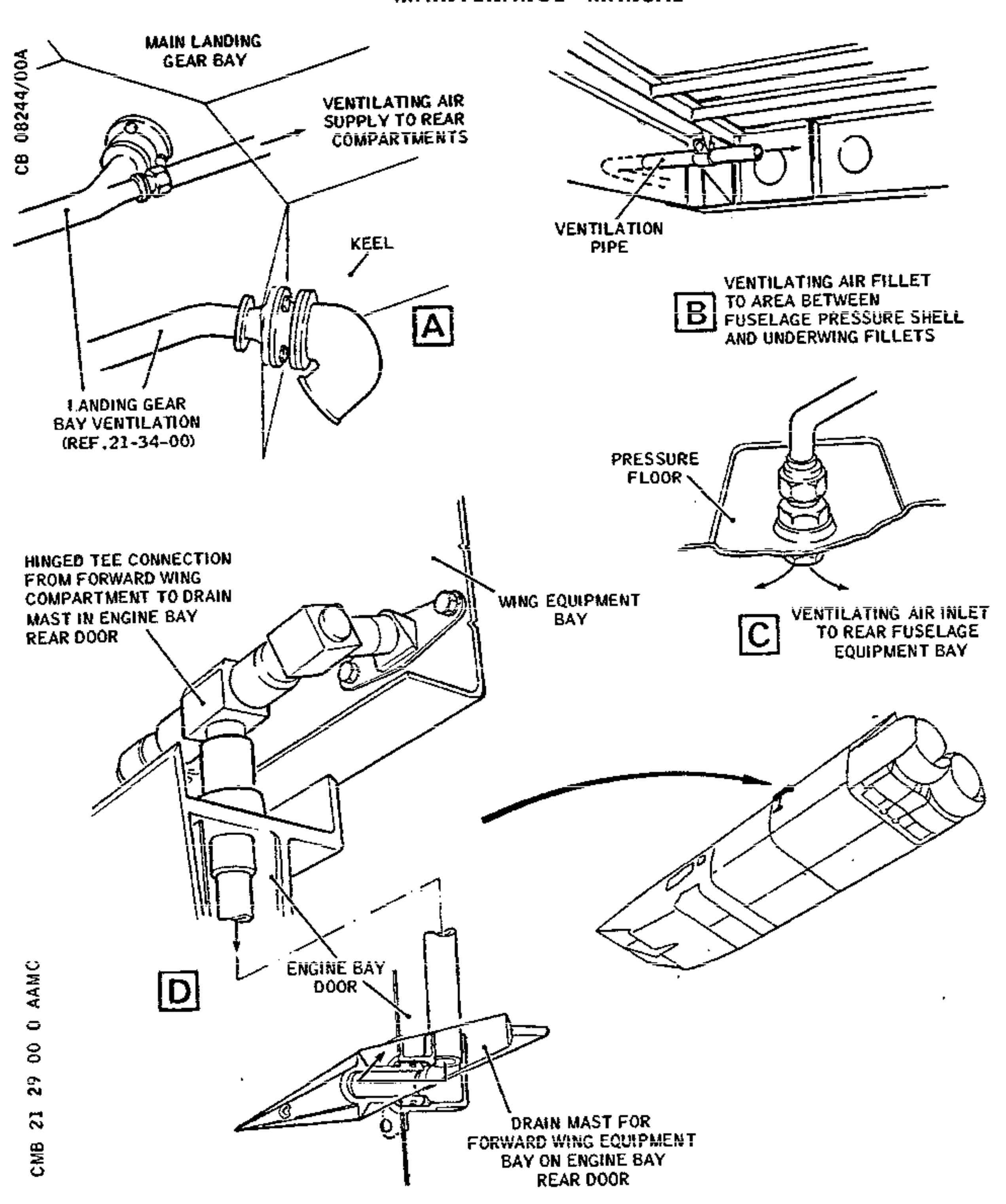
Access to the pipe run is through floor panels 233F, 233JF,



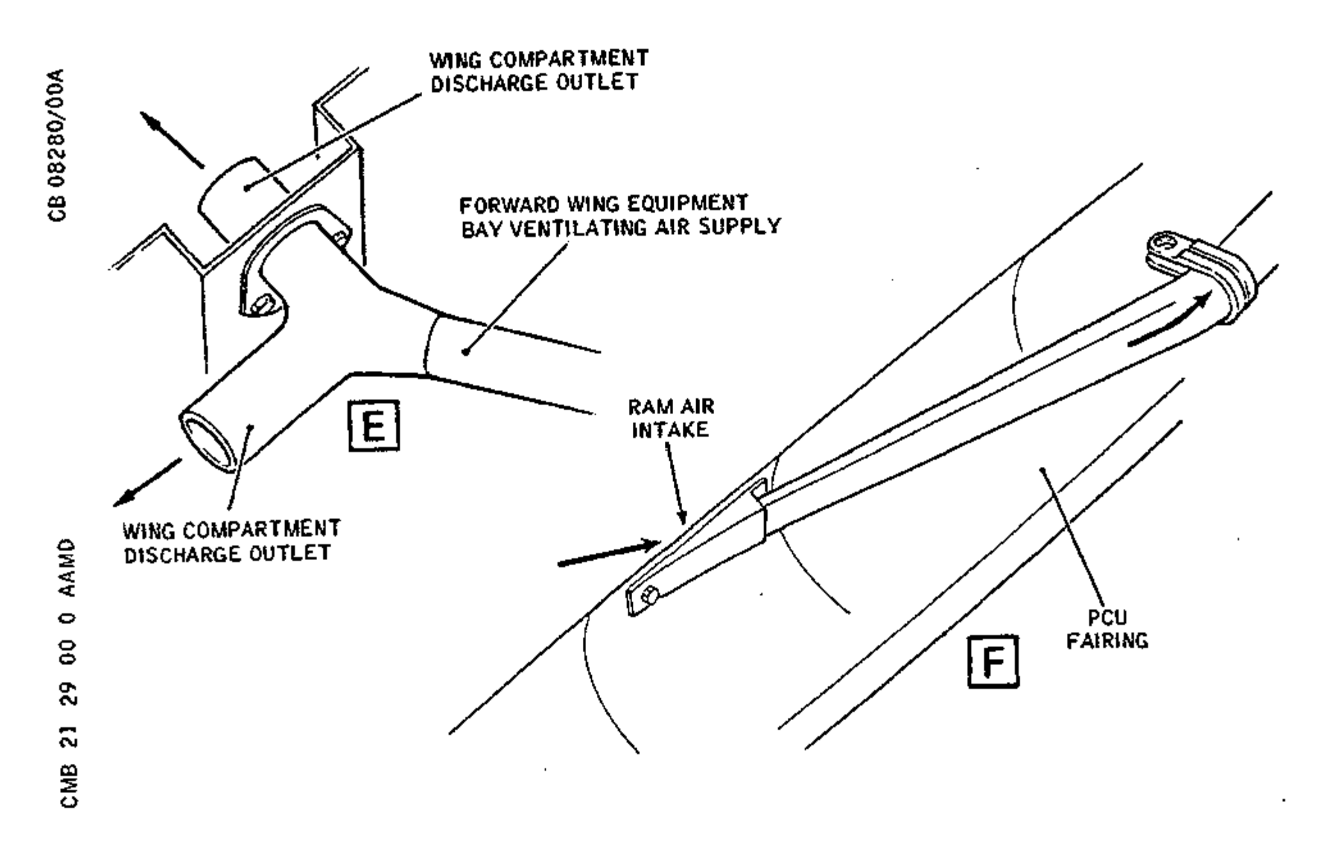
Ventilation of Miscellaneous Compartments
Figure 001



Ventilation of Miscellaneous Compartments
Figure 001



Ventilation of Miscellaneous Compartments
Figure 001



Ventilation of Miscellaneous Compartments
Figure 001

241AF.

After circulating the compartment, the ventilating air discharges overboard through an outlet in the compartment access panel.

4. Forward Wing Equipment Bay Ventilation

Air taken from or ram air intake in each outer elevon PCU fairing ventilates the associated wing equipment bay. Light alloy pipes from the intake carry the air to the forward wing equipment bay, where it discharges through two outlets approximately at the centre of each compartment. Access to the pipes is through wing access panels CT in zones 532, 632; CT, EJ in zones 534, 634; AT, BT in zones 543, 643 and PCU fairings EB in zones 552, 152.

Combined air and drain outlets from the left and right sides of the equipment bay are connected, through internal gutters and hinged drainage assemblies, to each of the engine bay rear doors. The outlets from the engine bay doors are faired rearward.

MISCELLANEOUS FUSELAGE AND WING COMPARTMENTS VENTILATION - INSPECTION/CHECK

1. General (Ref. Fig.601 and 602)

A check of the light alloy ventilating pipes in the fuselage is made by applying air to the tapping from the main landing gear bay ventilation system and checking by hand that there is a discharge of air from the compartment overboard vents.
In the forward wing compartments the procedure is to blow air into the ram air intakes and overboard vents and check that there is a discharge of air into the compartments.

2. Areas Enclosed by LH and RH Underwing Fillets and Rear Fuselage Equipment Bay

A. Equipment and Materials

DESCRIPTION	PART NO.
Air supply, 0 to 15 psi (0-1035 mb)	-

B. Prepare

(1) Gain access to the forward end of the keel in the main landing gear bay and disconnect to light alloy pipe tapping attached to the RH main landing gear bay ventilation fitting.

(2) Attach the air supply to the disconnected pipe with a suitable adapter.

C. Test

(1) Apply an air pressure of 10 psig (1.7 bar) to the fuselage compartment ventilation and check that there is a discharge of air from the small LH and RH underwing fillet vents in panels 197 GB and 198 GB, and from the NACA vent in panel 151 CB.

(2) Stop the air supply rig and check that the discharge of air from the same vents stops.

D. Conclusion

(1) Disconnect the air suppyl rig.

(2) Reconnect the compartment ventilation pipe to the RH main landing gear bay ventilation fitting. Secure the pipe union handtight.

3. Forward Wing Equipment Compartments

A. Equipment and Materials

DESCRIPTION	PART NO.
Air supply 0-15 psi (0-1035 mb)	-
Access panel key	E920132000
Wing access platform	-
Rubber mats	-

B. Prepare

(1) Remove elliptical wing panels 532 CT and 632 CT by inserting the access panel key in each of the four catches and pressing out from the centre.

C. Check

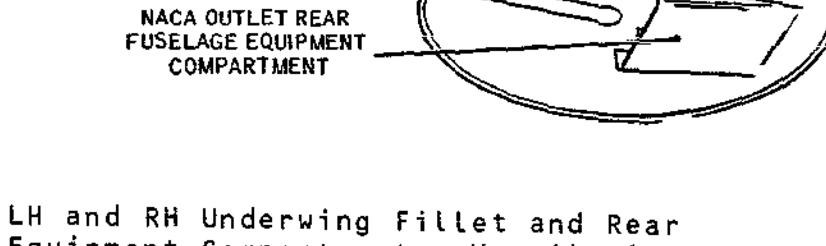
(1) By means of a suitable rubber adapter, connect the air supply to the ventilating ram air intake on the outer PCU fairing and apply an air pressure of 10 psig (1.7 bar). Check by hand that there is a discharge of air from both branches of the ventilating fitting in the associated wing compartment.

(2) Transfer the air supply to the over-board vents on the inner and outer rear engine bay doors and apply an air pressure of 10 psig (1.7 bar) to each in turn.

(3) Check that a free flow of air is emitted into the forward wing equipment compartment in each case.

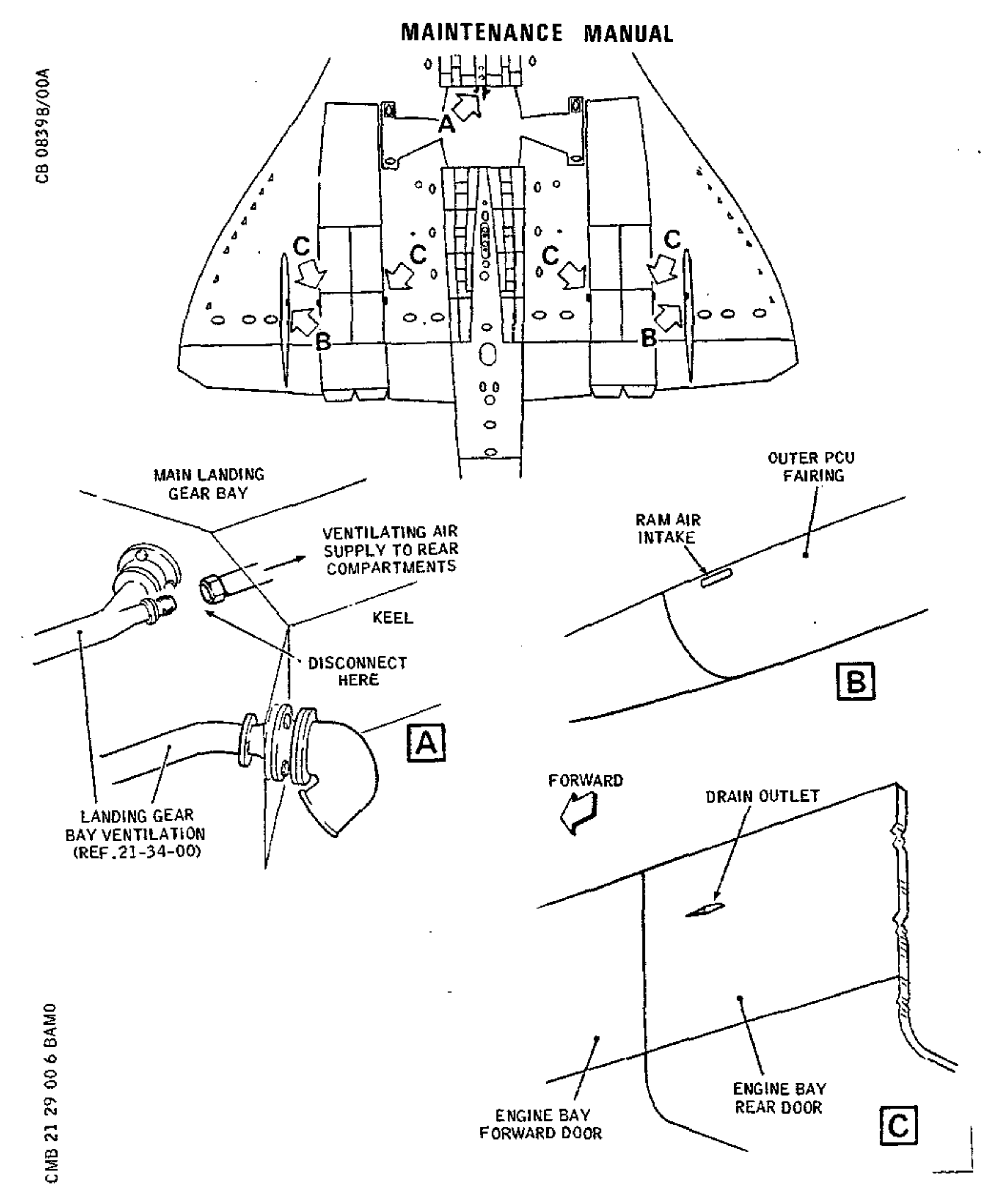
(4) Repeat operations (1), (2), (3) on both sides of the aircraft.

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LH and RH Underwing Fillet and Rear
Equipment Compartment - Ventilation
Figure 601



Forward Wing Equipment Compartment - Ventilation
Figure 602

D. Conclusion

(1) Disconnect the air supply rig.

(2) Check that no loose articles are left in the wing compartments.

(3) Refit and secure the elliptical wing panels by inserting the access panel key into each of the four catches and pressing towards the centre of the panel.

PRESSURE CONTROL - DESCRIPTION AND OPERATION

1. General

In normal operation, the cabin pressure control system maintains cabin pressure or limits cabin pressure variation rate to values compatible with passenger comfort.
In the event of failure, the system ensures safety within the limits of its functions.
The system ensures the following functions :

- Cabin pressure control
- Cabin pressure safety
- The system safety, control and indicating
- Ventilation control of landing gear bay and various systems ventilated by air blown from the pressurized cabin
- Thrust recovery
- Cabin pressure relief on the ground.

(Ref. Fig.001 and 002)

2. Pressure Control

A. Cabin Pressure Control

(1) The cabin pressure control system consists of :

(a) The cabin altitude/pressure control :
- 5,000 ft to 10,000 ft (- 1,524 m to 3,048 m).

(b) The cabin pressure variation rate :
from 200 to 1,000 ft/mn (1 to 5 m/s).

(c) The limitation of cabin positive normal maximum differential pressure : 10.7 ± 0.1 psi (738 ± 7 mb).

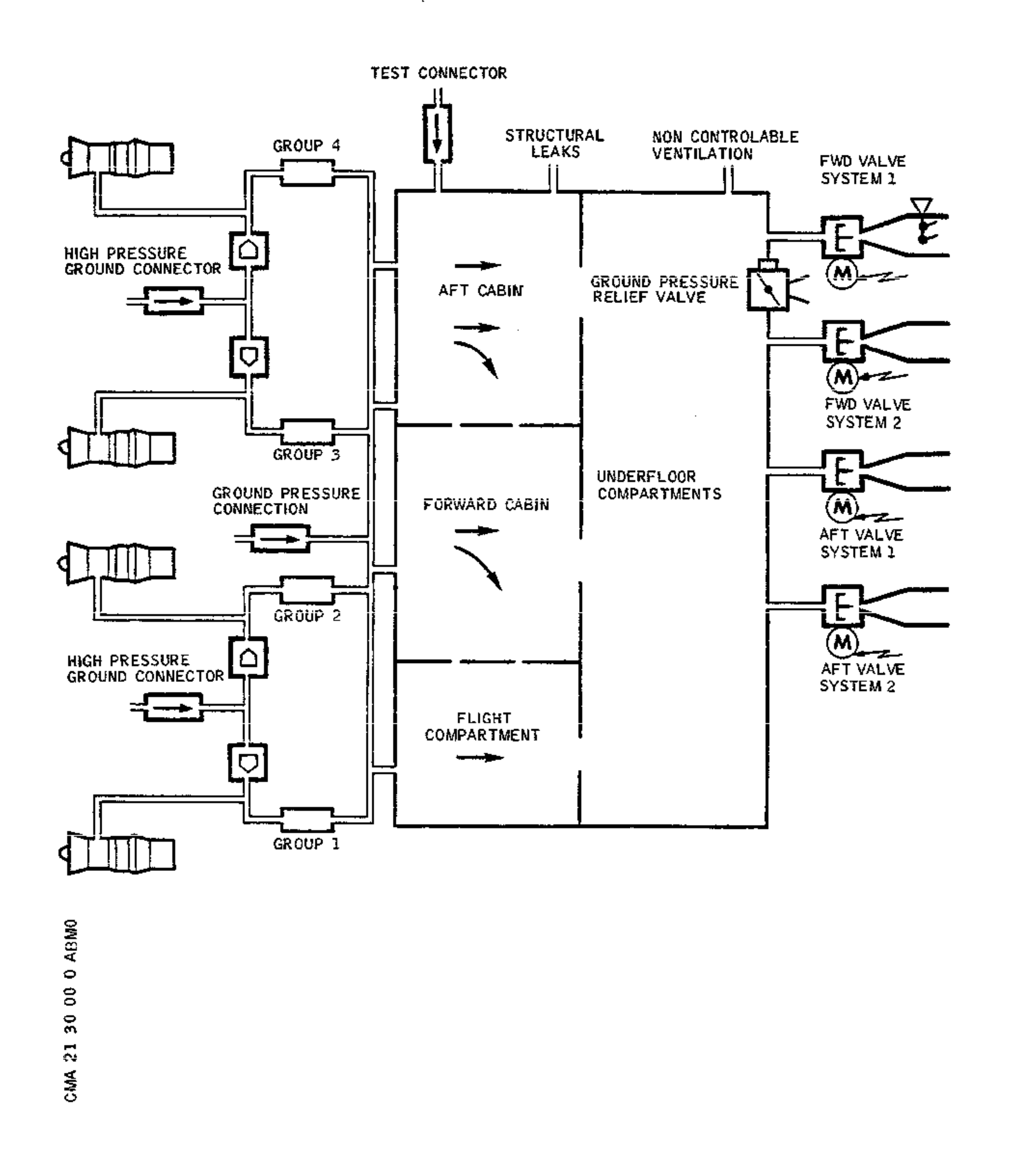
(2) The cabin pressure safety system ensures the following functions :

(a) Limitation of the cabin accidental maximum altitude pressure to 11,000 ± 250 ft (3,350 ± 75 m).

(b) Limitation of cabin positive accidental maximum differential pressure to 11.2 ± 1 psi (713 ± 7 mb).

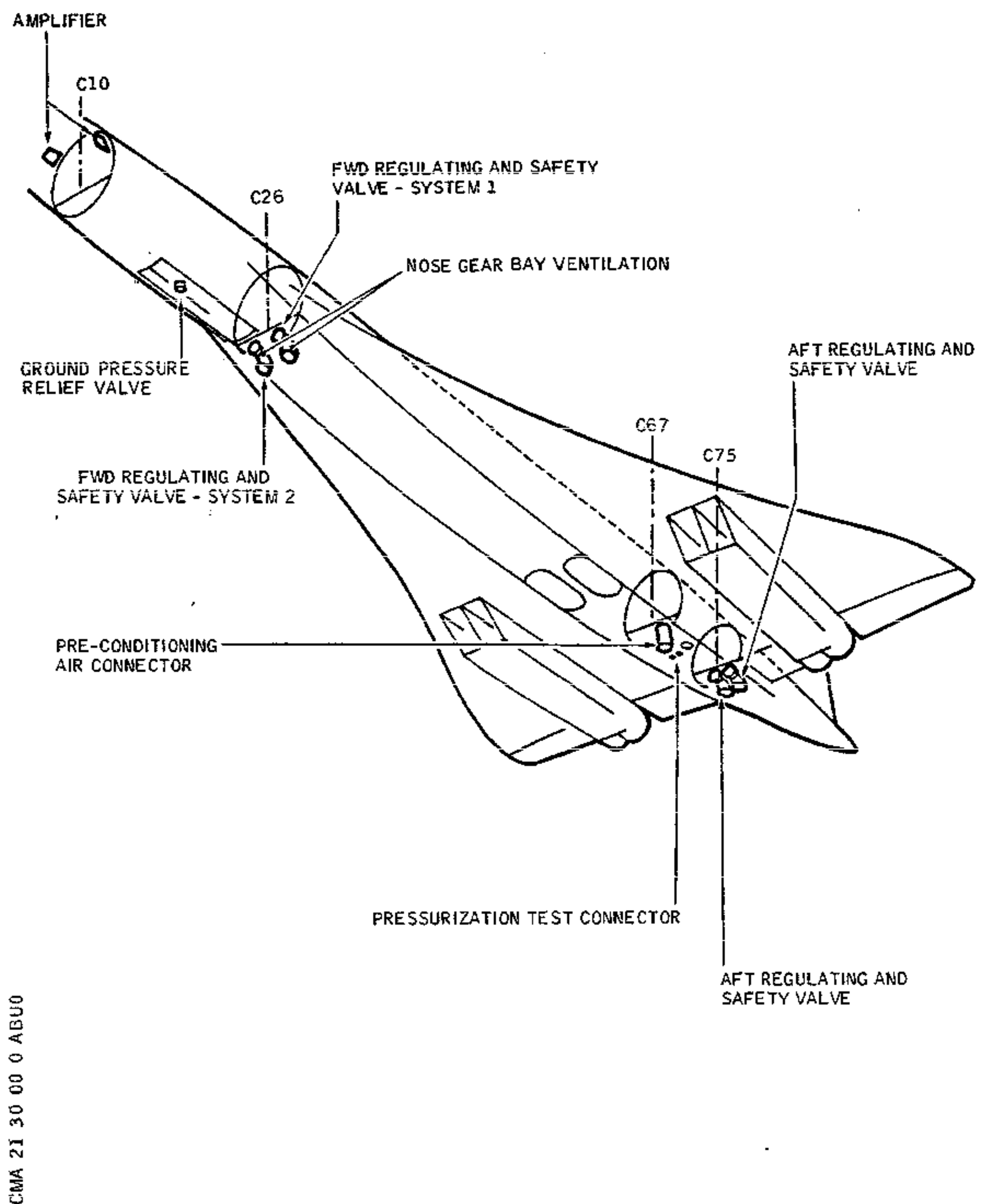
(c) Limitation of cabin negative accidental maximum differential pressure to - 5 psi (- 35 mb).

R (3) Controls and Indicating



R

Cabin Pressure Control - Schematic
Figure 001



CMA 21 30 00 0 ABU0

Cabin Pressure Control - Component Location
R Figure 002

The various functions quoted above are ensured by : (Ref. Fig. 003)

(a) One cabin altimeter at Flight Engineer's Station.

B (a) Two altimeters (one at the Captain's station, the
B other at the Flight Engineer's Station.

(b) 2 pressure regulating selectors (one manual, one automatic).

(c) A cabin differential pressure indicator

(d) A rate of climb indicator

(e) A regulating and safety valve position indicator (DISCHARGE VALVE POSITION).

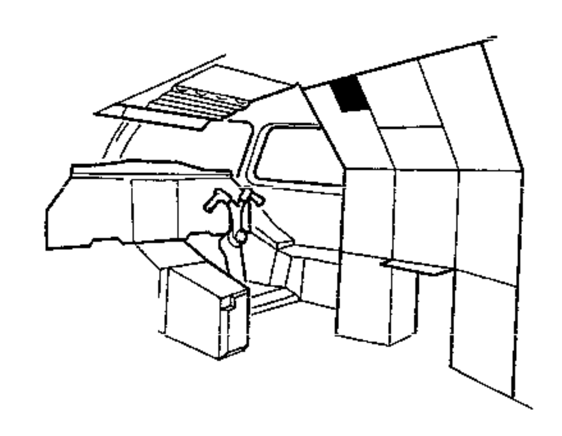
(f) A PRESS warning light, operated when either the cabin altitude pressure or cabin differential pressure is excessive

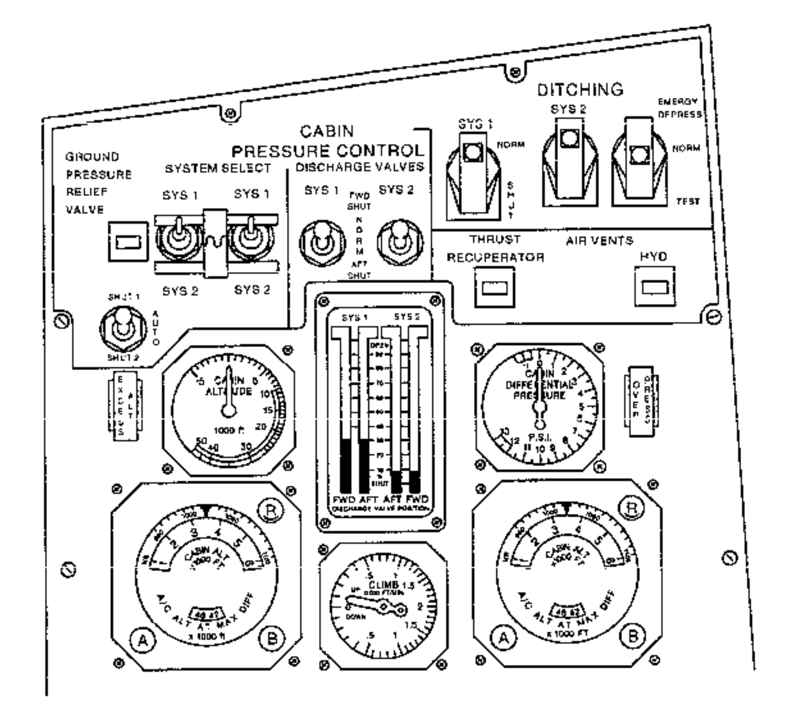
(g) An O/PRESS warning light operated when the differential pressure is excessive

(h) An EXCESS ALT warning light operated when the altitude pressure is excessive

(i) The pressure control indicating system also includes horns (repetitive gong) associated with warning lights.

The cabin pressure is controlled by two semi-automatic and independent pressure control systems, SYS 1 and SYS 2.
The air used for pressurization is supplied by the four air conditioning groups (1 for each engine) or by a ground air conditioning unit. Cabin pressure causes the air to be discharged via the pressure regulating and safety valves, operated by signals fed from sensing elements through an amplifier, via the main landing gear bay ventilation valve, the forward hydraulic chassis and aft electronics compartment, and also via non-controllable normal structural leaks.
The pressure control system is of the electro-pneumatic type :
- The detection is pneumatic
- The signals transmitted between selector, controller and regulating and safety valves are electric





CMB 21 30 00 0 AEM0 00

Cabin Pressure Control Panel
Figure 003

- The valve operation is pneumatic.
Each valve can be manually controlled by means of the DISCHARGE VALVES switches on CABIN PRESSURE CONTROL Flight Engineer's panel.
(Ref. Fig. 004)

3. Ventilation

A. Controllable Airflow Ventilation.

The items of equipment ventilated with a controlable air-flow are :
- the main and nose gear bays
- the electric equipment and hydraulics bay (Ref. 21-20-00).

(1) Nose landing gear

Part of the air discharged by forward regulating and safety valves is bled on the valve discharge nozzle to ventilate the nose gear bay ; it flows through a venturi ; the venturi regulates the airflow. A safety valve on each regulating and safety valve operates if overpressure occurs in the nose gear bay.

B. Permanent Ventilation

The following components are permanently ventilated.

(1) Main Landing Gear bay

(2) Double wall of fuselage fuel tanks (tanks 6-8-9-11).

(3) Wave guide (Also permanently pressurized).

(4) Batteries.

(5) Lavatories.

(6) Forward and Aft electronics racks.

(7) Forward and Aft galleys

The airflow ventilating these components is regulated by venturi.

4. Thrust Recovery

During normal cruise, the thrust recovery nozzle enables recovery of maximum thrust while the airflow is sufficient to provide pressure control and a correct landing gear bay ventilation. The thrust recovery nozzle is installed on system 1 forward regulat-

CMA 21 30 00 0 AEMO

Zc = CABIN ALTITUDE

Pc mb | Zc

ΔPc = -5PSI (-35 mb)

ΔPc = 0

Zc=14000ft

Zc = 11000 ft = ALTITUDE LIMITED BY VALVE LIMITER

Zc=10000 ft = UPPER LIMIT OF SELECTOR

ΔPc = 10.7 PSI (738mb) = NORMAL MAXI

ΔPc = 11.2 PSI (773mb) = OPERATION STARTING MAXI ACCIDENTAL

ΔPc = 11.7 PSI (808mb) = MAXI ACCIDENTAL

mb: 1000, 900, 800, 700, 600, 500, 400, 300, 200, 100, 0

AIRCRAFT Zc ft: 0, 5000, 10000, 15000, 20000, 30000, 40000, 50000

Pc mb: 500, 600, 700, 800, 900

Zc: 20000, 15000, 10000, 5000

Pressure Control Operating Range
Figure 004

ing and safety valve discharge nozzle.
The thrust recovery nozzle is of the pneumatic type. It operates when the differential pressure value ranges between 3 psi (200 mb) (beginning of opening) and 7.5 psi (517 mb) (complete closing).
A THRUST RECUPERATOR magnetic indicator located on CABIN PRESSURE CONTROL Flight Engineer's panel indicates the nozzle position.

5. Cabin Pressure Relief on the Ground

The purpose of the cabin pressure relief system is to prevent cabin overpressure when the ground air conditioning unit is connected to the aircraft. It also prevents negative pressure in the cabin when the aircraft doors are closed or when the electronics racks air extraction system is operating. The ground pressure relief valve is of the electro-mechanic type ; it is electrically operated (automatically or manually).
In flight, the valve is closed ; a safety device operates when the differential pressure is greater than 1.4 psi (100 mb). It is why the valve cannot open if the opening winding is untimely supplied.
A GROUND PRESSURE RELIEF VALVE magnetic indicator located on CABIN PRESSURE CONTROL Flight Engineer's panel, indicates the valve position.
A SHUT 1-AUTO-SHUT 2 switch located under the magnetic indicator enables selection of the mode (automatic or manual). In addition it enables check of integrity of both control motors by enabling the valve to be actuated by motor 1 or motor 2.

WARNING : OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00.

1. General

This topic describes the removal procedure for all secondary equipment for which removal has not been dealt with in this chapter.

Some instruments on flight compartment instrument panels require the removal of the associated electro-luminescent panel (Ref. 33-16-00). The panels are interconnected by flying leads or connected by terminals located at the rear of the panels.

2. Control Switches
R (Ref. Fig. 401)

A. Equipment and Materials for switches H1151, H1152, H1153 only

DESCRIPTION	PART NO.
Snapwire	

B. Prepare

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SYS 2 FWD AFT DISCHARGE VALVE SUP	1-213	H1124	E13
SYS 2 DITCHING VALVE CONT		H1150	F10
SYS 1 DITCHING VALVE CONT		H1149	G13
DEPRESSN MOTOR 1 SUP CONT IND		H1163	H12
DEPRESSN MOTOR 2 SUP CONT IND		H1164	H13
SYS 2 PRESSN CONT SUP	2-213	H1159	H15

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SYS 1 FWD AFT DISCHARGE VALVE SUP	5-213	H1125	E 8
SYS 1 GRD PRESSN CONT	15-215	H1157	E03
SYS 2 GRD PRESSN CONT	15-216	H1158	D23

(3) Loosen quick release fasteners and open CABIN PRESSURE CONTROL panel.

C. Remove

(1) Switches H1151, H1152, H1133

(a) If necessary remove cable ties in order to obtain easy access to equipment terminals.

(b) Disconnect electrical cable from terminals. Use a suitable insertion/extraction tool for switches fitted with pin type connectors.

(c) On front of panel, break switch guard snapwire, and lower guard.

(d) Loosen and remove switch attachment nut.

(e) Remove locking washer, remove switch guard and locating washer.

(f) Remove switch.

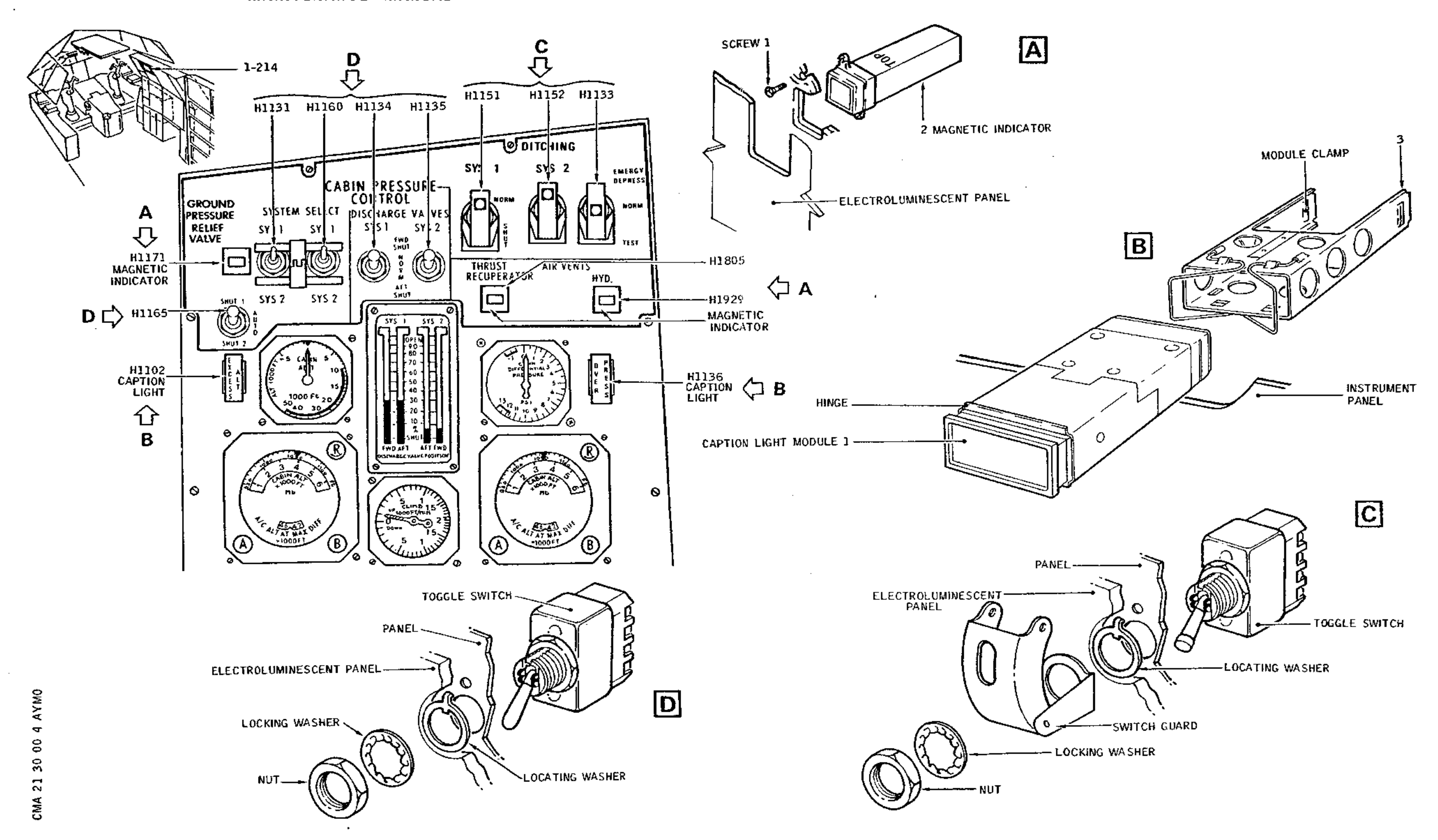
(2) Switches H1131, H1160, H1165, H1134, H1135

(a) If necessary remove cable ties in order to obtain easy access to terminals of equipment concerned.

(b) Disconnect electrical cable from terminals. Use a suitable insertion/extraction tool for switches fitted with a pin type connector.

(c) On front of panel, loosen and remove switch atta-chment nut.

(d) Remove locking washer and locating washer.



CMA 21 30 00 4 AYMO

Instruments and Controls on Panel 1214
Figure 401

R

(e) Remove switch.

D. Install

(1) Switches H1151, H1152, H1133

(a) Install switch correctly according to the position of locating washer.

(b) Position locating washer, install switch guard and locking washer.

(c) Fully tighten switch attachment nut.

(d) Connect electrical cable to the switch. Use a suitable insertion/extraction tool on switches fitted with pin type connectors. Make certain that connections are made in conformity with the electrical cable identifiers and associated wiring diagrams.

(e) Replace the electrical cable ties if necessary.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(f) Close the panel, tighten quick release fasteners.

CAUTION : WHEN CLOSING THE PANEL CHECK THAT NO CABLES ARE CAUGHT OR DAMAGED.

(2) Switches H1131, H1160, H1165, H1134, H1135

(a) Install switch correctly according to the position of locating washer.

(b) Install locating washer and locking washer.

(c) Fully tighten switch attachment nut.

(d) Connect electrical cable to the switch. Use a suitable insertion/extraction tool on switches fitted with a pin connector. Make certain that the connections are made in conformity with the electrical cable identifiers and associated wiring diagrams.

(e) Replace the electrical cable ties, if necessary.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS

CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(f) Close the panel, tighten quick release fasteners.

CAUTION : WHEN CLOSING PANEL CHECK THAT NO CABLES ARE CAUGHT OR DAMAGED.

E. Test

(1) Switches H1151, H1152, H1133

(a) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

R (b) Check correct operation of switch by carrying out the appropriate test procedure.

(c) Move switch guard upwards and safety with snapwire.

(2) Switches H1131, H1160, H1165, H1134, H1135

(a) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(b) Check correct operation of switch by carrying out the appropriate test procedure.

R 3. Caption Light
R (Ref. Fig. 401)

A. Prepare

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
CABIN EXCESS ALT WARN IND	1-213	H1101	G11
CABIN OVERPRESS IND	5-213	H1126	E 9

(3) Loosen quick release fasteners, open CABIN PRESSURE CONTROL panel.

B. Remove

(1) If necessary, remove cable ties in order to obtain easy access to the terminals of equipment concerned.

(2) Disconnect electrical cables from terminals. Use a suitable insertion/extraction tool for switches fitted with a pin type connector.

(3) Disconnect springs (2) securing attachment clamp (3) and remove caption light 1 from front of panel.

C. Install

NOTE : Install caption lights on panel with hinge adjacent to white line on back of panel.

(1) Install securing clamp (3) at rear of panel. Install caption light in its housing.

(2) Hold caption light (1) against front of panel. Press on securing clamp (3) until retaining springs engage in groove on caption light assembly.

(3) Connect electrical cables to caption light. Use a suitable insertion/extraction tool on caption lights fitted with pin type connectors. Make certain that connectables are made in conformity with relevant electrical

cable identifiers and associated wiring diagrams.

(4) Replace the electrical cable ties if necessary.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(5) Close the panel, tighten quick release fasteners.

CAUTION : WHEN CLOSING PANEL CHECK THAT NO CABLES ARE CAUGHT OR DAMAGED.

D. Test

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(2) Check correct operation of caption light by carrying out the appropriate test procedure.

4. Magnetic Indicator
R (Ref. Fig. 401)

A. Prepare

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FWD THRUST VENT VALVE POSN IND	15-215	H1802	F 4
HYD BAY VENT CONT IND		H1928	G 2

(3) Loosen quick release fasteners, open CABIN PRESSURE CONTROL panel.

B. Remove

R (1) Remove electro-luminescent panel (Ref. 33-16-00).

(2) Remove the cable ties from panel, if necessary, in order to obtain easy access to the equipment concerned.

(3) Disconnect electrical cable from terminals. Use a suitable insertion/extraction tool on magnetic indicators fitted with pin type connectors.

(4) Loosen attachment screw (1) remove magnetic indicator (2).

C. Install

(1) Install magnetic indicator (2). Tighten attachment screws (1).

NOTE : Assemble magnetic indicator with the word TOP adjacent to white line on back of panel assembly.

(2) Connect electrical cables to magnetic indicator. On indicators fitted with pin type connectors use a suitable insertion/extraction tool. Make certain that connections are made in conformity with the electrical cable identifiers and associated wiring diagrams.

(3) Remove electro-luminescent panel (Ref. 33-16-00).

(4) Install cable ties as required.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(5) Close the panel, tighten quick release fasteners.

CAUTION : WHEN CLOSING PANEL CHECK THAT NO WIRES ARE CAUGHT OR DAMAGED.

D. Test

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(2) Check correct operation of magnetic indicator by carrying out the appropriate test procedure.

5. Diode

A. Equipment and Materials for Diodes H1173 and H1174.

DESCRIPTION	PART NO.
Access Platform 10 ft. (3.220 m.)	

B. Prepare

(1) Prepare for diodes H1173 and H1174.

(a) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(b) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
DEPRESS MOTOR 1 SUP CONT & IND	1-213	H1163	H12
DEPRESS MOTOR 2 SUP CONT & IND		H1164	H13

(c) In zone 123, install access platform, open access door 123AB.

(2) Prepare for Diodes H1176 and H1178.

(a) De-energize the aircraft electrical network and disconnect electrical ground power unit. (Ref. 24-41-00, Servicing).

(b) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SYS2 GRD PRESSN CONT	15-216	H1158	D23

(3) In flight compartment, open access door 1-214.

C. Remove

(1) Remove diodes H1173 and H1174.
(Ref. Fig. 402)

(a) In compartment 123, on unit 11-123, unscrew knurled nuts (1) and remove fasteners (2) from unit.

(b) Remove cables from the top of the unit (two quick release fasteners on each clamp).

(c) Pull unit forward by 2/3 of its length in order to gain access to diodes.

(d) Remove the four attachment screws from protective plate (4) ; retain washers ; remove the plate.

(e) On diode board, unscrew nuts (6) and (8), remove washers (5) and (7) ; remove diode.

(2) Remove Diodes H1176 and H1178
(Ref. Fig. 403)

(a) On aft face of panel 1-214, remove screw (2) ; remove protective plate (1) from diode board

(b) Unsolder the diode to be removed

CAUTION : BEFORE UNSOLDERING THE DIODE, PROTECT THE CABLES AND EQUIPMENT TO PREVENT DAMAGE BY DROPS OF SOLDER

D. Preparation of Replacement Component

(1) Diodes H1173 and 1174

(a) If necessary, cut the right length of terminal wire.

(b) At the diode input crimp a dia. 4 terminal lug ; at the diode output crimp a dia. 6 terminal lug.

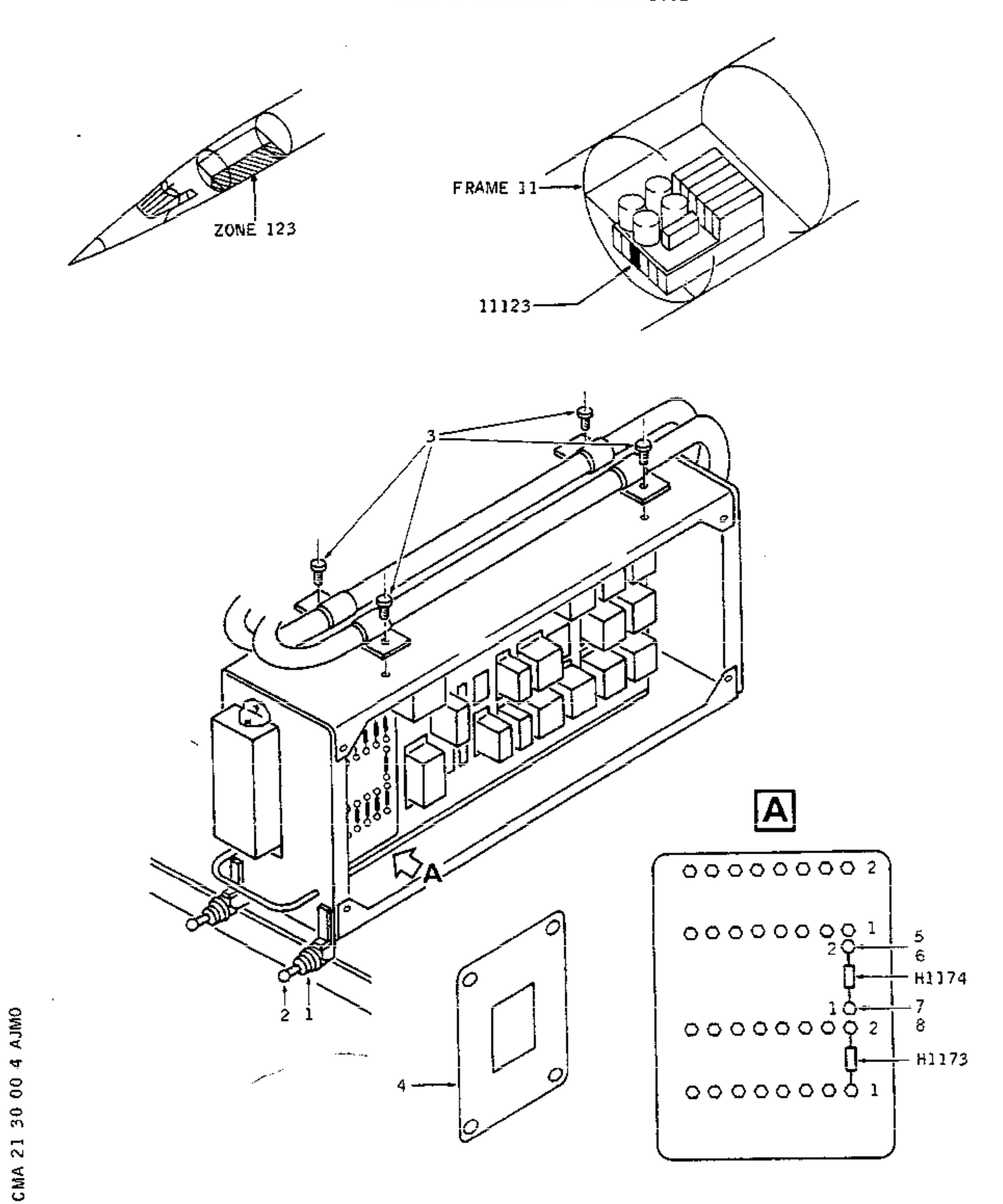
(c) Crimp a dia. 6 terminal lug to the other diode output.

(2) Diodes H1176 and H1178

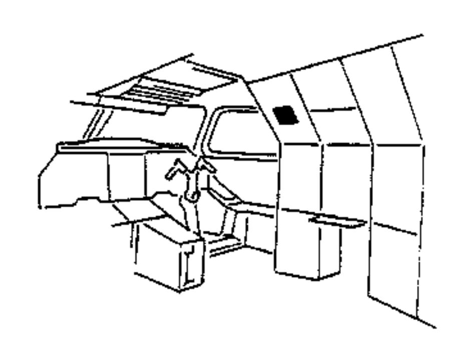
(a) If necessary cut the right length of terminal wire

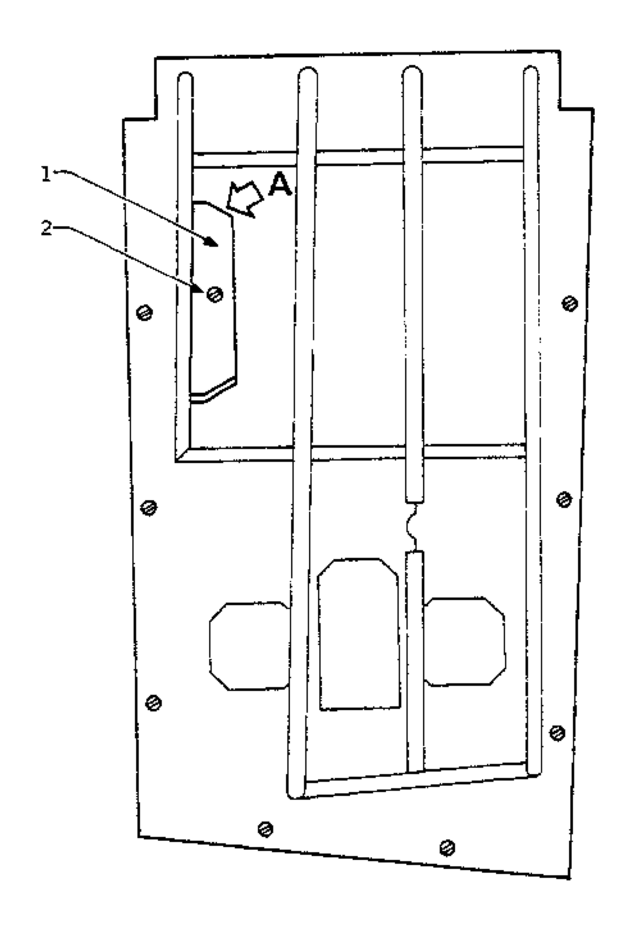
E. Install

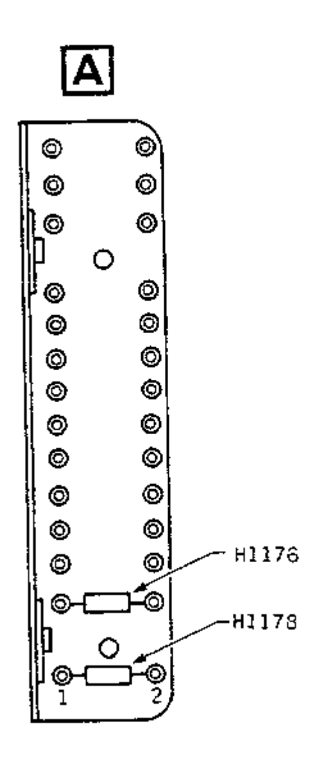
(1) Diodes H1173 and H1174
(Ref. Fig. 402)



Diodes H1173 - H1174 in unit 11-123
Figure 402







CMA 21 30 00 4 ALMO

Diodes 1176 and 1178
Figure 403

(a) Install the diode terminal lug assembly on terminals.

(b) Install washers (5) and (7) ; screw nuts (6) and (8).

(c) Install protective plate (4) ; install washers, screw the four attachment screws.

(d) Install cables on top of the unit ; tighten clamp screws (3)

(e) Install unit in its housing ; install fasteners (2) ; tighten knurled nuts (1)

(2) Diodes H1176 and H1178
(Ref. Fig. 403)

(a) Solder diode to soldering points ; respect the polarity :

- diode input to terminal 1
- diode output to terminal 2

CAUTION : BEFORE SOLDERING THE DIODE, PROTECT THE CABLES AND EQUIPMENT TO PREVENT DAMAGE BY DROPS OF SOLDER.

(b) Install protective plate on diode board. Install screw (2).

F. Close-Up

(1) Diodes H1173 and H1174

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT

(a) In zone 123, close access door 123AB, remove access platform.

(b) Remove safety clips and tags and reset the circuit breakers tripped in paragraph B (1) b.

(2) Diodes H1176 and H1178

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT

(a) In flight compartment, close access door 1-214

(b) Remove safety clip and tag and reset the circuit breaker tripped in paragraph B (2) b.

G. Test

(1) Check that the replaced component operates correctly by carrying out the corresponding test procedure

6. Relays

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 10.7 ft (3.20 m)	

B. Prepare

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(2) In zone 123, open access door 123AB for relays H1166, H1167, H1168, H1169, H1170, H1175 and access door 123BB for relays H1147 - H1153 - H1154.

(3) According to the relay to be removed trip, safety and tag one of the following circuit breakers :

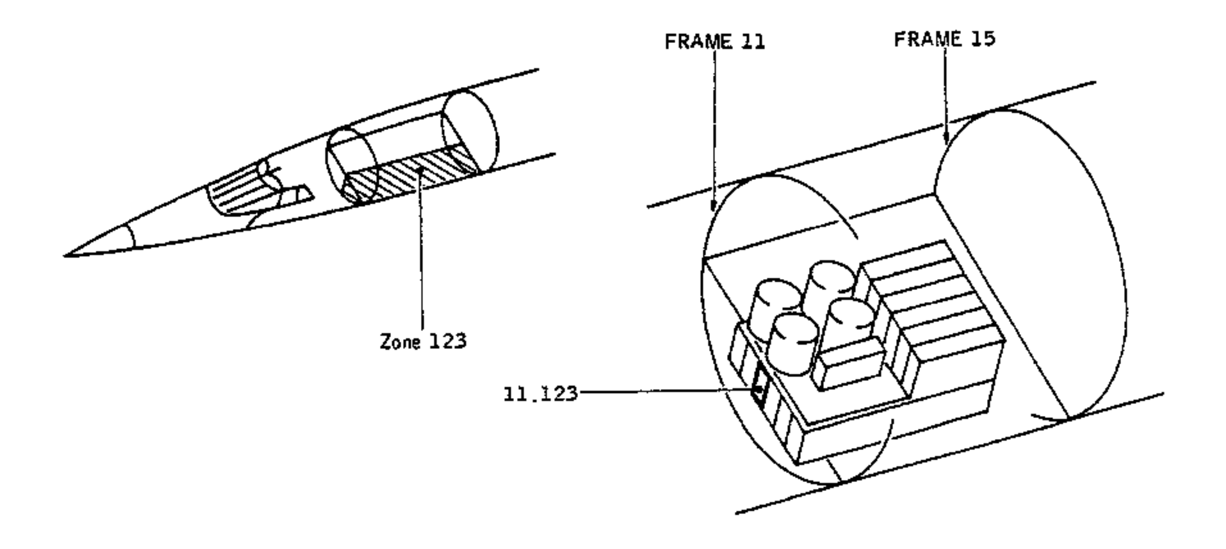
SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Relay H1153			
SYS1 DITCHING VALVE CONT	1-213	H1149	G13
Relay H1154			
SYS2 DITCHING VALVE CONT	1-213	H1150	F10
Relay H1166			
DEPRESSN MOTOR 1 SUP CONT & IND	1-213	H1163	H12
DEPRESSN MOTOR 2 SUP CONT & IND		H1164	H13
Relay H1167			
DEPRESSN MOTOR 1 SUP CONT & IND	1-213	H1163	H12
DEPRESSN MOTOR 2 SUP CONT & IND		H1164	H13
Relay H1168			
DEPRESSN MOTOR 1 SUP CONT & IND	1-213	H1163	H12
DEPRESSN MOTOR 2 SUP CONT & IND		H1164	H13

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Relay H1169			
DEPRESSN MOTOR 1 SUP CONT & IND	1-213	H1163	H12
DEPRESSN MOTOR 2 SUP CONT & IND		H1164	H13
Relay H1170			
DEPRESSN MOTOR 1 SUP CONT & IND	1-213	H1163	H12
DEPRESSN MOTOR 2 SUP CONT & IND		H1164	H13
Relay H1175			
SYS1 GRD PRESSN CONT	15-215	H1157	E03
Relay H1177			
SYS2 GRD PRESSN CONT	15-216	H1158	D23

(4) Relay Location
(Ref. Fig. 404, 405 and 406)

RELAY	FUNCTION	LOCATION
H1153	RELAY DITCHING VALVES	14.123
H1154	RELAY DITCHING VALVES	17.123
H1166	RELAY CONT & INDIC SUP CO	11.123
H1167	RELAY DEPRESSN VALVE CLOSED	11.123
H1168	RELAY DEPRESSN VALVE OPEN	11.123
H1169	RELAY TIME DELAY ON CLOSING	11.123
H1170	RELAY TIME DELAY ON CLOSING	11.123
H1175	RELAY THROT SW SLAVE	11.123
H1177	RLY EMERG DEPRESSN CONT	17.123

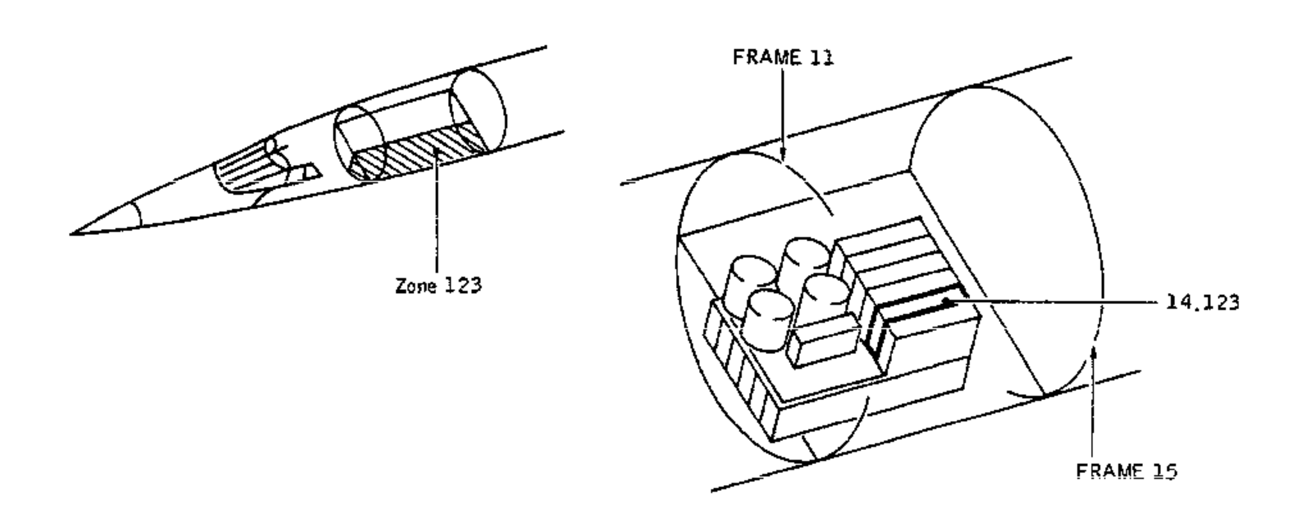
C. Remove
(Ref. Fig. 407)

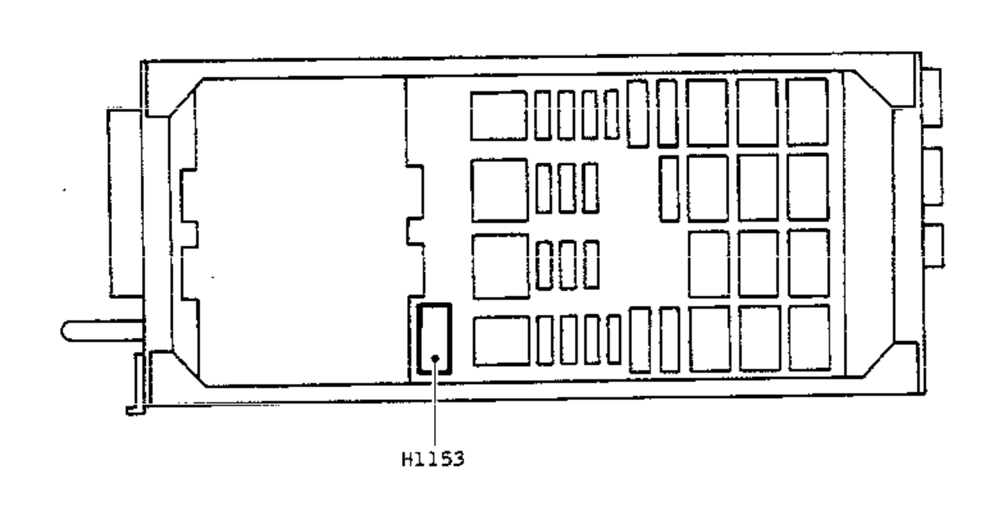


H1175
H1170
H1169
H1166
H1167
H1168

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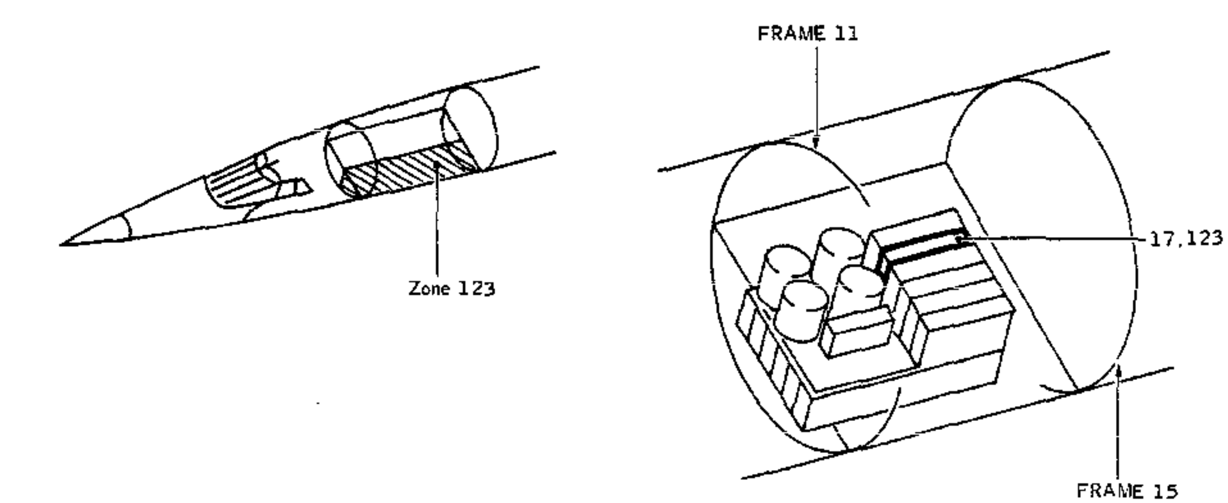
Relay Box 11-123
Figure 404

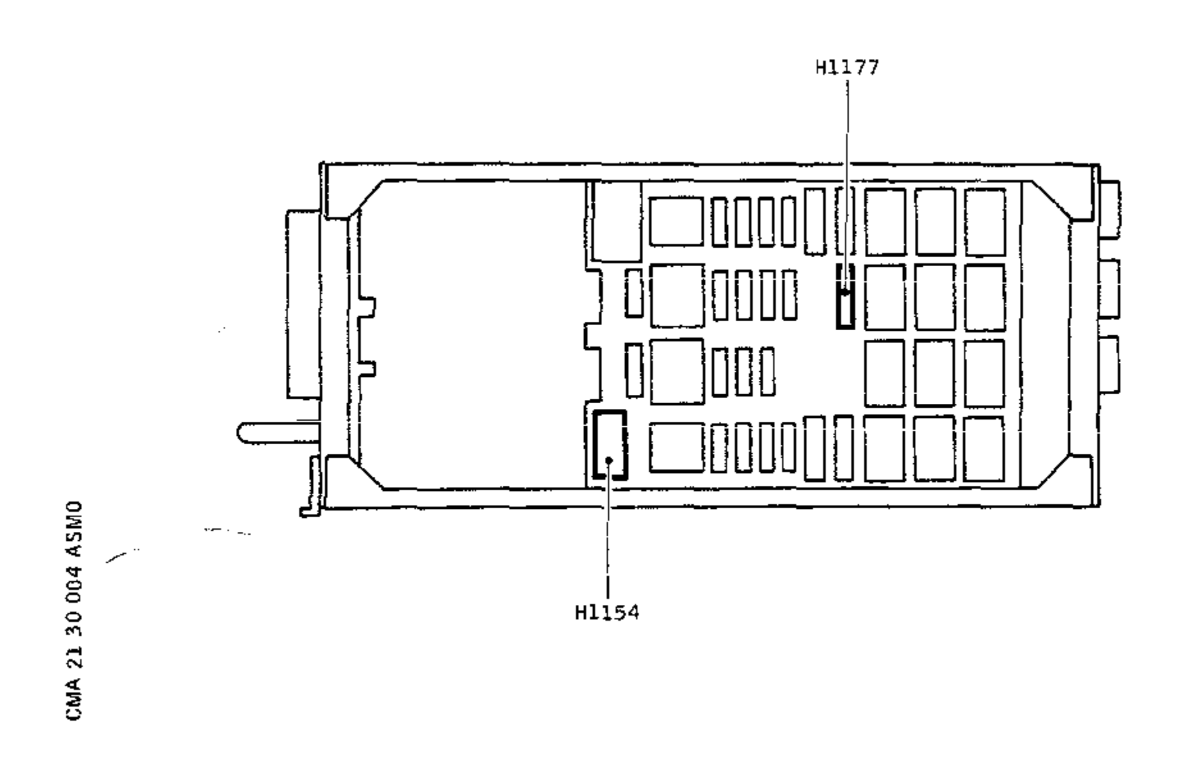




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Relay Box 14-123
Figure 405





Relay Box 17-123
Figure 406

(1) In compartment 123, on unit to be removed unscrew knurled nuts (1) and remove fasteners from unit.

(2) Remove cables from the top of the unit (2 quick release fasteners on each clamp (3)).

(3) Pull unit forward in order to gain access to relay to be removed.

(4) Remove relay nuts (4) ; retain washer (5).

(5) Slightly pull relay to remove it.

D. Install

(1) Install relay on its support ; install washers (5) ; screw nuts (4).

(2) Install cables on the top of the unit, tighten clamp (3) screws.

(3) Install unit in its housing ; install fasteners (2) ; tighten knurled nuts (1).

G. Close-Up

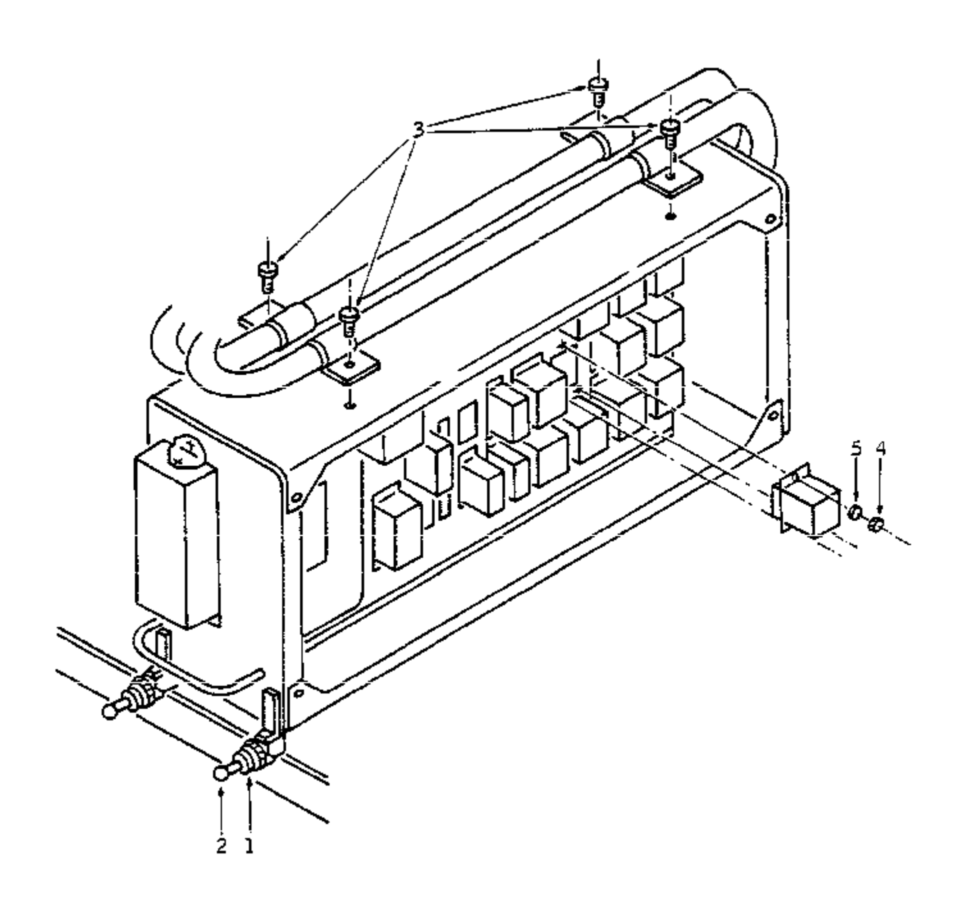
CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(1) In zone 123, close access doors 123AB or 123BB ; remove access platform.

(2) Remove safety clips and tags and reset the circuit breakers tripped in paragraph B (3).

H. Test

Check that the removed relay operates correctly by carrying out the corresponding test procedure.



CMA 21 30 00 4 AUMO

Relay Removal
Figure 407

THRUST RECOVERY - DESCRIPTION AND OPERATION

1. General
   (Ref. Fig. 001)

   The thrust recovery nozzle is mounted on system 1 forward regulating and safety valve discharge nozzle.

   During normal cruize, with pressure control system 1 selected, the thrust recovery nozzle enäbles maximum thrust to be recovered while the airflow ventilating the nose gear bay does not vary and cabin pressure control is not affected.

2. Description (Ref. Fig. 002)

   The thrust recovery nozzle is pneumatically operated.
   The body consists of a main cylindrical housing the lower part of which matches with the aircraft contour ; two rotating flaps are located inside the body.
   The flaps can be fully open or partly closed ; in this position they have the function of diffusers at the nozzle outlet ; they are linked together by means of an adjustable rod ; they are connected to a guided pin integral with the spring diaphragm.
   On the body side, a cylindrical housing contains :

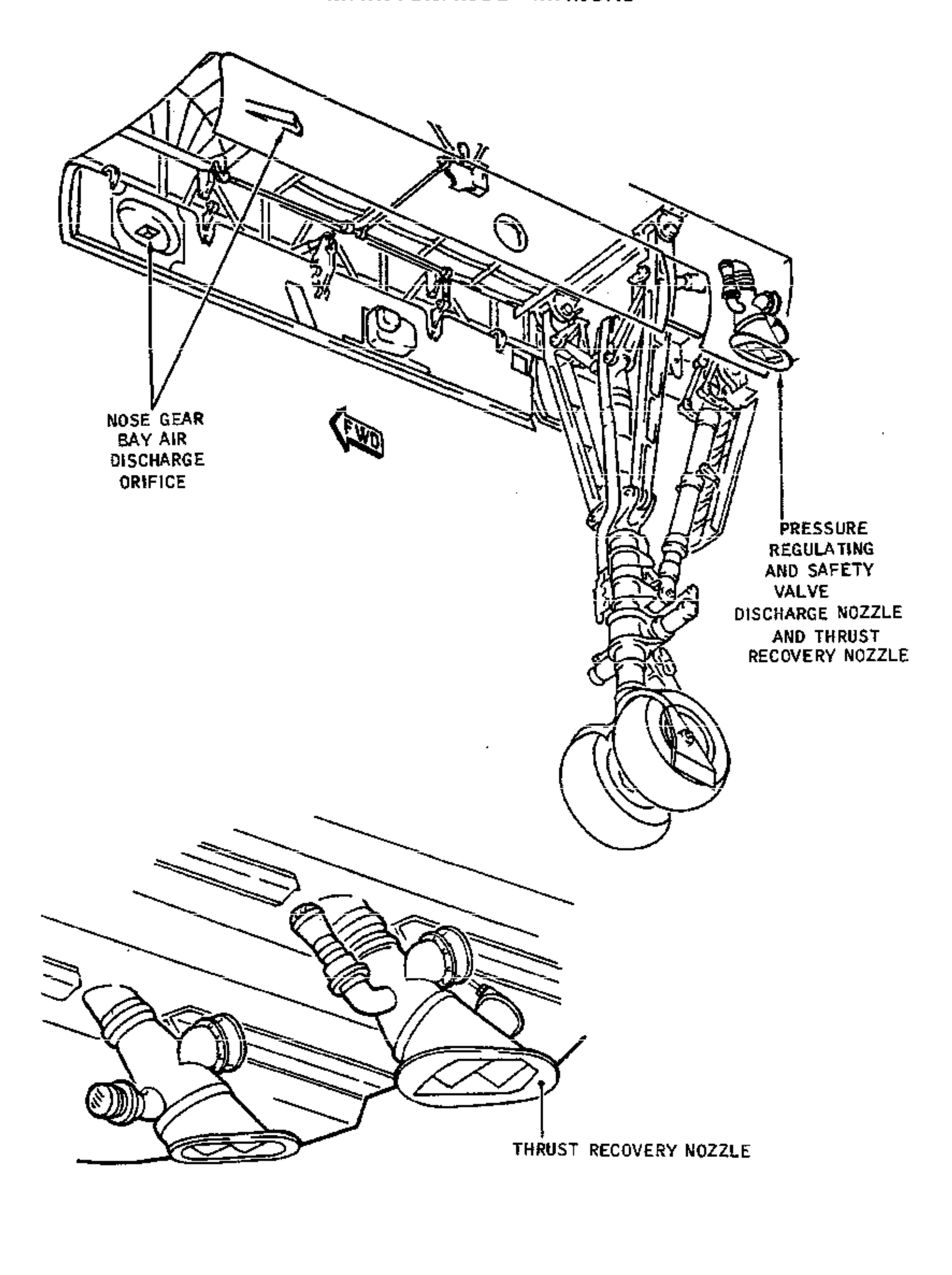
   - At the upper part, the cabin pressure sensing chamber
   - At the lower part the ambient pressure sensing chamber with compensation spring.

   Both chambers are separated by a spring diaphragm.
   Two microswitches located near the sensing chambers transmit the flap position indication to the magnetic indicator located on CABIN PRESSURE flight engineer's panel.
   These microswitches are actuated by two arms linked to the aft flap by an adjustable link rod.

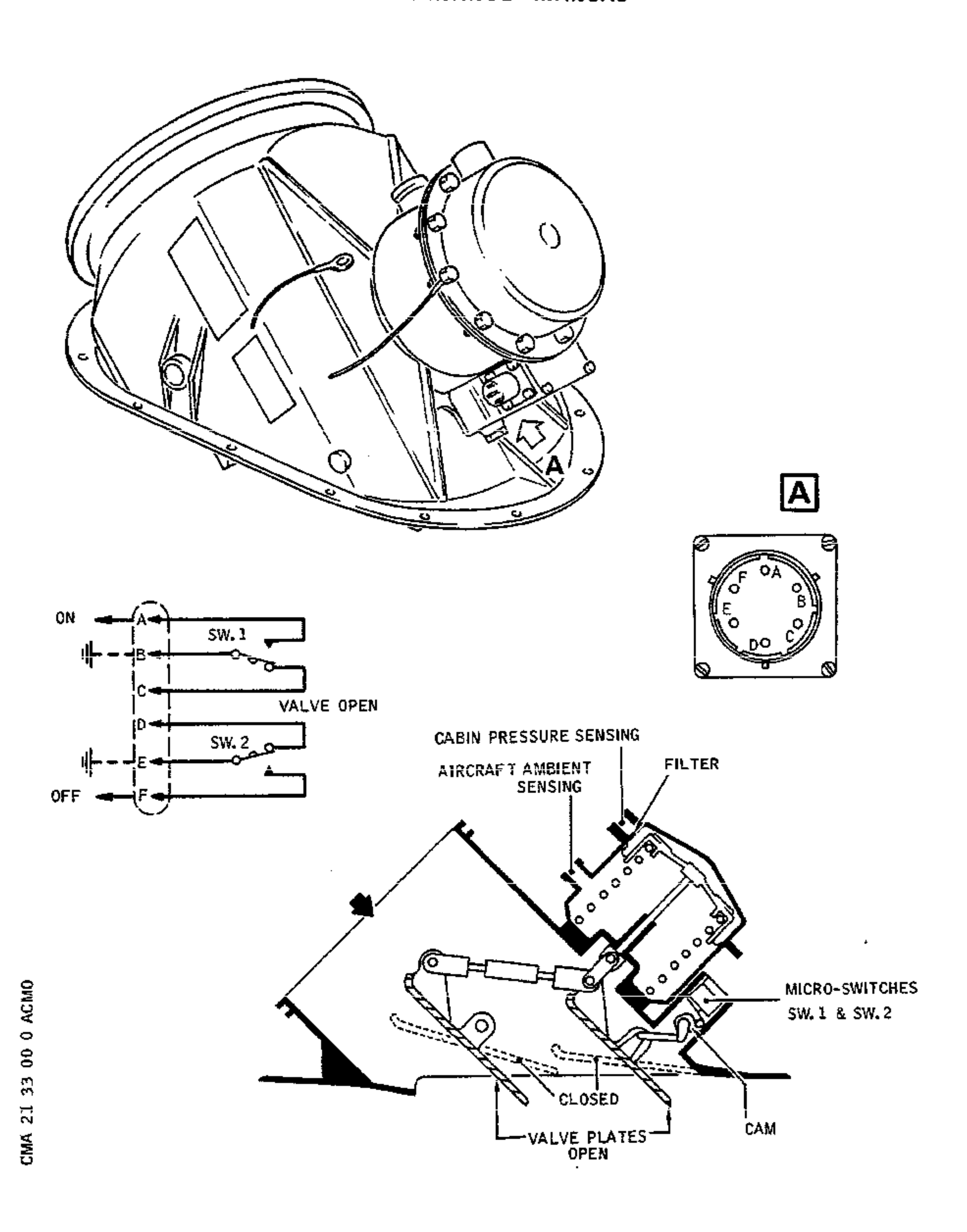
3. Operation

   A. When the differential pressure is lower than 3 psi (200 mbar), the diaphragm is in the up position, the nozzle flaps are open. Microswitch 1 transmits the OFF information to THRUST RECUPERATOR magnetic indicator on CABIN PRESSURE panel.

   B. When pressure value is greater than 3 psi (200 mbar), the spring diaphragm tends to compress downwards ; the flaps progressively close ; THRUST RECUPERATOR magnetic indicator displays stripes.



Location of Thrust Recovery Nozzle
R Figure 001



Thrust Recovery Nozzle Valve
Figure 002

C. When the differential pressure reaches 7.5 psi (517 mbar), the spring diaphragm is compressed downwards, the flaps are closed. Microswitch 2 transmits an ON information to THRUST RECUPERATOR magnetic indicator. When the flaps are closed, they close the nozzle.
The thrust produced by the thrust recovery nozzle is proportional to the airflow across it.

THRUST RECOVERY - TROUBLE SHOOTING

1. General

The following trouble shooting procedures are intended to enable faults found in the thrust recovery system on the ground or in flight to be quickly rectified.

The defect can be isolated with the aid of trouble shooting procedures (Ref. Para. 3), and traced through OK or NOT OK paths to the appropriate charts or other specified rectification action as may be necessary. If a defect occurs, perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure that the operation is OK.

Bracketed numbers in the procedures and charts indicate items on the component identification table (Ref. Table 101). The table provides information, including component location, required for rectification.

All procedures dealing with trouble shooting are based on the assumption that electrical wiring is serviceable, all associated circuit breakers are set and electrical power is available, unless otherwise stated. If the fault is not rectified, check the wiring in accordance with the Wiring Diagram Manual (Ref. Table 101).

2. Prepare

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Multimeter	

NOTE : Trouble Shooting shall be carried out with aircraft in ground configuration, shock absorbers compressed.

B.

(1) Make certain that the following circuit breaker is set:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FWD THRUST & VENT VALVE POSN IND	15-215	H1802	F4

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

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3. Trouble Shooting

```
*****************************************************
* Thrust recovery nozzle valve [1] closes. IF       *
*****************************************************
     ||   |         ---------------------------------------------------
     ||   |         | On panel 1-214 CABIN PRESSURE CONTROL :         |
     ||   |         | - SYS SELECT switch in SYS 1 position.          |
     ||   |         | - Differential pressure indicator indicates     |
     OK   NOT OK----|   pressure greater than 520 mbars.              |
     ||   |         |   THRUST RECUPERATOR indicator [3] indicates    |
     ||   |         |   OFF.                                          |
     ||   |         | Replace valve [1].                              |
     ||   |         ---------------------------------------------------
*****************************************************
* Valve [1] opens. IF                               *
*****************************************************
     ||   |         ---------------------------------------------------
     ||   |         | On panel 1-214 CABIN PRESSURE CONTROL :         |
     ||   |         | - SYS SELECT switch in SYS 1 position.          |
     ||   |         | - Differential pressure indicator indicates     |
     OK   NOT OK----|   pressure less than 210 mb.                    |
     ||             | - THRUST RECUPERATOR indicator [3] indicates    |
     ||             |   ON.                                           |
     ||             | Replace valve [1].                              |
     ||             ---------------------------------------------------
*****************************************************
* Valve [1] indication operates correctly. IF       *
*****************************************************
     ||   |         ---------------------------------------------------
     ||   |         | THRUST RECUPERATOR indicator [3] is striped.    |
     OK   NOT OK----| AIR VENTS L/G indicator is striped.             |
     ||   |         | Replace circuit breaker [2].                    |
     ||   |         ---------------------------------------------------
     ||   |         ---------------------------------------------------
     ||   |         | THRUST RECUPERATOR indicator [3] is striped.    |
     ||   NOT OK----| Ref. Chart 101.                                 |
     ||             ---------------------------------------------------
*****************************************************
* Thrust recovery system is operational.            *
* De-energize the aircraft electrical network and   *
* disconnect electrical ground power unit           *
* (Ref. 24-41-00, Servicing).                       *
*****************************************************
```

```
***************************************
* THRUST RECUPERATOR INDICATOR [3] IS*
* STRIPED.                           *
***************************************


******************************************************
* On valve [1] disconnect connector H1807A. On power*
* side of connector shunt terminals C and B :       *
* - Indicator [3] indicates OFF.                    *
* Shunt terminals D and E :                         *
* - Indicator [3] indicates ON.                     *
******************************************************
             |                        |
             OK                    NOT OK
             |                        |
             |                        |
             |                        |
--------------------------   -------------------------
| Replace valve [1].     |   | Replace indicator [3].|
--------------------------   -------------------------
```

Chart 101

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
[1] Thrust recovery nozzle valve	711		H1807		21-33-11 R/I	21-35-12
[2] Circuit breaker		15-215	H1802	F 4	24-50-00 R/I	21-35-12
[3] Indicator-THRUST RECUPERATOR		1-214	H1805		21-30-00 R/I	21-35-12

Component Identification
Table 101

THRUST RECOVERY NOZZLE - REMOVAL/INSTALLATION

1. General

The thrust recovery nozzle is installed in the air discharge duct of system 1 forward pressure regulating and safety valve.

2. Thrust Recovery Nozzle

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 10 ft. 7 in. (3.22 m)	
Safety Clips	
Common Grease (Ref. 20-30-00, No.051)	

B. Prepare

(1) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FWD THRUST VENT VALVE POSN IND	15-215	H1802	F 4

(2) Open nose gear doors (Ref. 32-00-00, Page 300).

(3) Position access platform.

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (2).

(2) Remove pipe (1).

(3) Remove thrust recovery nozzle attaching screws (3) at fuselage.

(4) Disconnect bonding strip (7).

(5) Remove nozzle (4) from cabin air discharge duct.

D. Preparation of Replacement Component

(1) Make certain that component bears no trace of impact damage or deterioration.

(2) Remove protective caps from electrical connector and make certain that pins are in correct condition.

(3) Remove O-ring (5).

(4) Install a new O-ring (5).

(5) Coat edge of sleeve (6) with Product No.051.

E. Install

(1) Engage nozzle (4) through fuselage port, connect sleeve (6) to cabin air discharge duct.

(2) Install nozzle attaching screws (3) at fuselage.

(3) Install pipe (1).

(4) Connect bonding strip (7).

(5) Connect electrical connector (2).

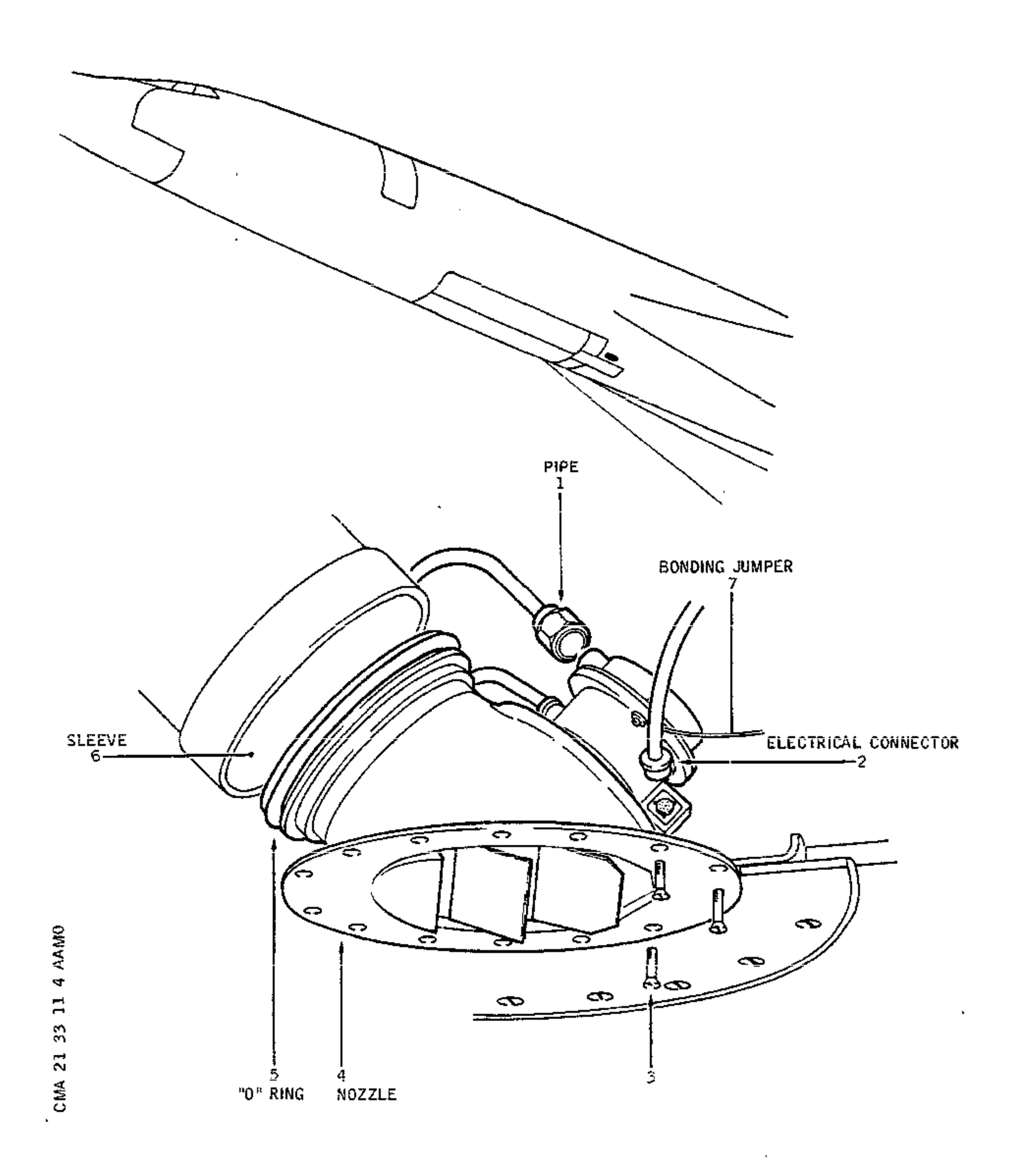
(6) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

F. Close-Up

(1) Remove access platform.

(2) Close nose gear doors (Ref. 32-31-00, Page 300).

(3) Remove safety clip and tag and set circuit breaker.



Thrust Recovery Nozzle
Figure 401

THRUST RECOVERY NOZZLE - ADJUSTMENT/TEST

1. General

The Thrust Recovery Nozzle (H1807) enables the maximum thrust to be recovered, while retaining the flow of air required for the ventilation of the landing gear compartments, and for adequate control of cabin pressure.

2. Functional Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Compressed Air Supply Unit, Equipped With Pressure Reducing Valve (to 11 psi (750 mbar) and Coupling AN91930	
Ground Service Telephone	
Access Platform - 10 ft. 7 in. (3.22 m)	

B. Prepare

(1) Check that the following circuit breaker is set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FWD THRUST - VENT VALVE POSN IND	15-215	H1802	F 4

(2) In nose landing gear bay, disconnect cabin pressure line from thrust recovery nozzle (H1807).

(3) Connect compressed air supply to threaded base of thrust recovery nozzle (H1807)(cabin pressure inlet).

(4) On Flight Engineer CABIN PRESSURE CONTROL panel, make certain that THRUST RECUPERATOR magnetic indicator displays stripes.

(5) Under the fuselage, at nose landing gear level, make

certain that System 1 forward thrust recovery nozzle deflectors are in OPEN position.

(6) Connect electrical ground power unit and energize the aircraft electrical networK (Ref. 24-41-00, S).

C. Test

(1) Pressurize progressively to a pressure of approximately 8 psi (551 mbar).

- On Flight Engineer CABIN PRESSURE CONTROL panel, THRUST RECUPERATOR magnetic indicator must display stripes, then ON.
- Under the fuselage, at nose landing gear level, system 1 forward thrust recovery nozzle deflectors must be in SHUT position.

(2) Shut down compressed air flow and depressurize the thrust recovery nozzle.

- On CABIN PRESSURE CONTROL panel, THRUST RECUPERATOR must display stripes and then OFF.
- Under the fuselage, at nose landing gear level, system 1 forward thrust recovery nozzle deflectors are in OPEN position.

(3) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, S).

- On CABIN PRESSURE CONTROL panel, THRUST RECUPERATOR magnetic indicator must display stripes.
- Under the fuselage, the thrust recovery nozzle deflector must remain in OPEN position.

D. Close-Up

(1) On the thrust recovery nozzle, accessible through the nose landing gear bay.

(a) Disconnect compressed air supply unit.

(b) Install the cabin pressure supply duct.

LANDING GEAR BAY VENTILATION - DESCRIPTION AND OPERATION

1. General

A ventilation system is installed in the landing gear bays in order to eliminate ozone and to cool the brakes and wheels. The nose landing gear ventilation system differs from the main gear ventilation system.

R **ON A/C 001-004

R A. Nose Gear Bay Ventilation (Ref. Fig. 001)

R (1) The nose gear bay ventilation is associated with the
R operation of pressure regulating and safety valves.
R The ventilating air is bled from regulating and safety
R valve discharge nozzles by a duct at the end of which
R a venturi and a non-return valve are mounted.
R The venturi limits the airflow ; the non-return val-
R ve prevents the air ventilating the nose gear bay from
R returning to the regulating and safety valve discharge
R nozzle.
R The air is discharged from the nose gear bay by two
R discharge orifices located on the landing gear bay
R longitudinal door (one orifice on each door).

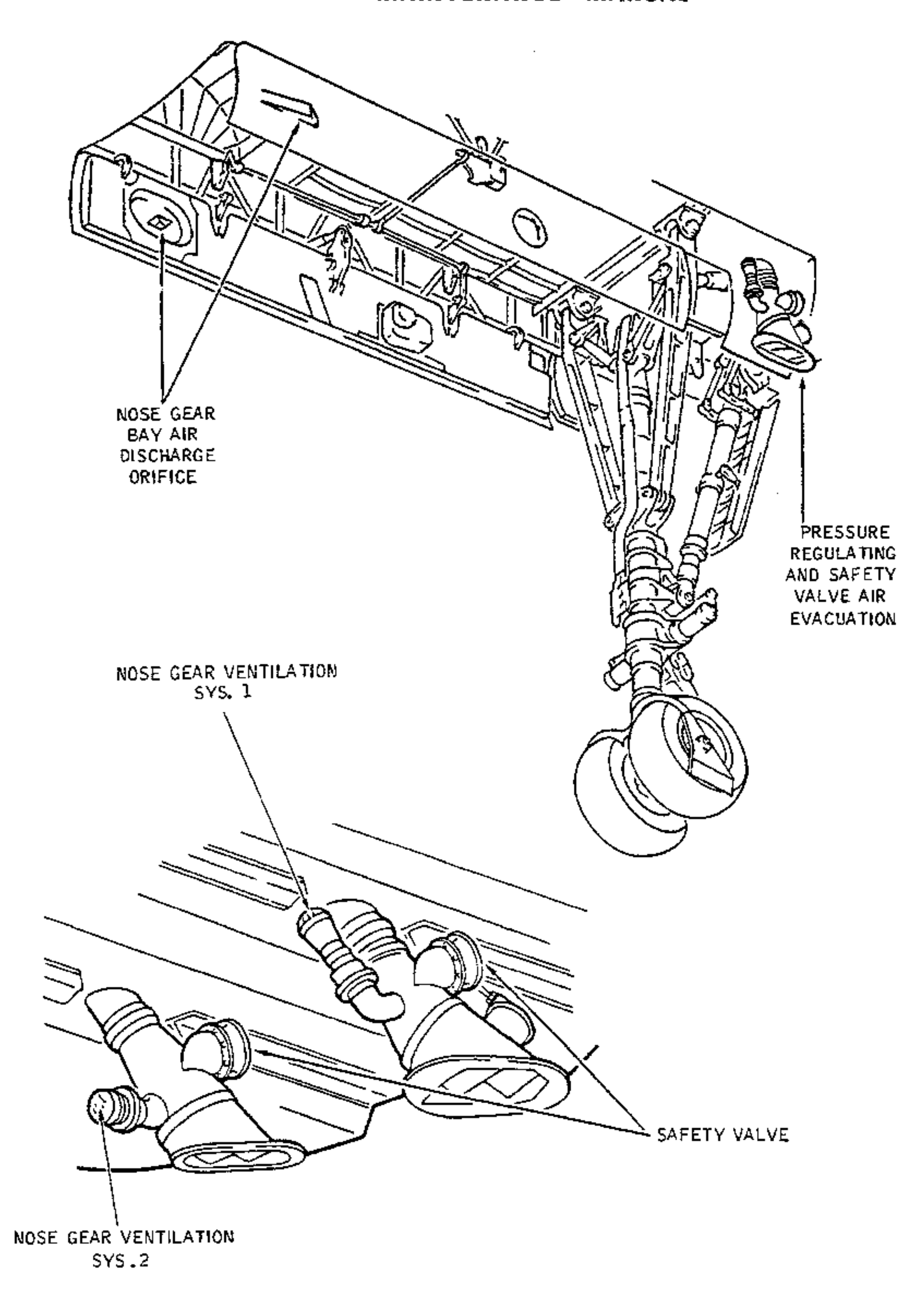
R After SB 21-044 For A/C 001-004

A. Nose Gear Bay Ventilation (Ref. Fig. 001)

(1) The nose gear bay ventilation is associated with the operation of pressure regulating and safety valves. The ventilating air is bled from regulating and safety valve discharge nozzles by a duct at the end of which a venturi is mounted. The venturi limits the airflow. The air is discharged from the nose gear bay by two discharge orifices located on the landing gear bay longitudinal door (one orifice on each door).

(2) Safety system

A safety valve is installed on each forward regulating and safety valve discharge nozzle. In the event of a malfunction of ground pressure relief valve the air is discharged through safety valves. If overpressure occurs inside the nose gear bay, both safety valve flaps open and the excess air is discharged overboard.



Nose Gear Bay Ventilation
Figure 001

R

R **ON A/C 001-004

R B. Main Gear Bay Ventilation
R (Ref. Fig. 002)

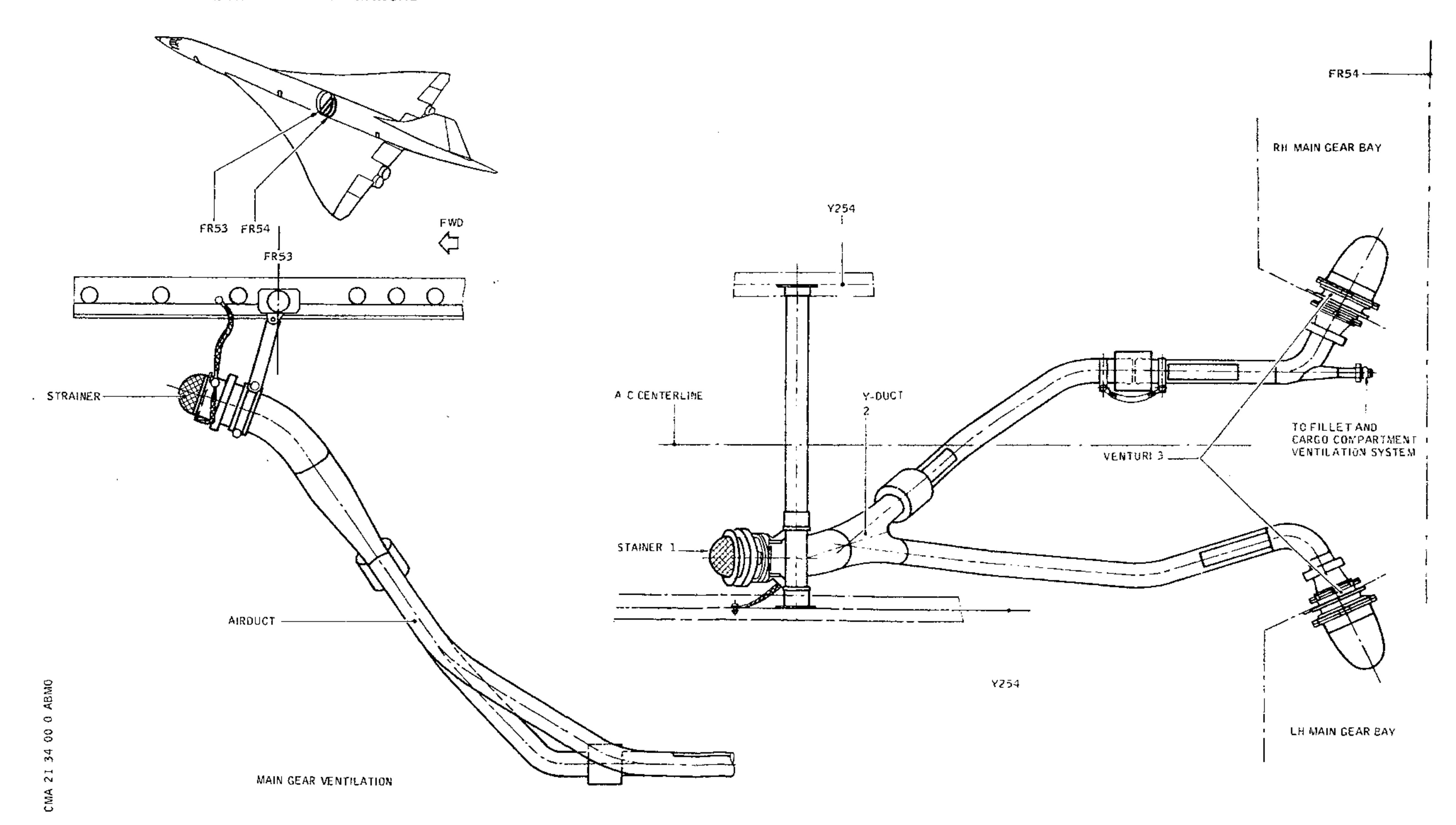
R (1) The main gear bay is ventilated by air bled under cabin
R floor at level of FR53.
R The air flows through a strainer (1) to a Y duct. Each
R branch ducts the air respectively to the LH and RH main
R gear bays. In each gear bay the ventilation airflow
R is controlled by a venturi (3) located at the air duct
R outlet.
R A non-return valve in each venturi prevents air from
R the gear bays returning to the pressurized area.

R After SB 21-044 For A/C 001-004

B. Main Gear Bay Ventilation
(Ref. Fig. 002)

(1) The main gear bay is ventilated by air bled under cabin floor at level of FR53.
The air flows through a strainer (1) to a Y duct. Each branch ducts the air respectively to the LH and RH main gear bays. In each gear bay the ventilation airflow is controlled by a venturi (3) located at the air duct outlet.

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Main Gear Bay Ventilation
Figure 002

RB

MAIN LANDING GEAR BAY VENTILATION VALVE NON-RETURN VALVE - REMOVAL/INSTALLATION

1. General

The main landing gear bay ventilation valve non-return valves are located in main landing gear bay. Non-return valve A506 is located in left hand landing gear bay and non-return valve B506 is located in right hand landing gear bay.

Both valves are identical, the removal/installation procedure is the same for both of them.

2. Non-Return Valve

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 10 ft 3 in (3.12 m)	-

B. Prepare

(1) Open the main landing gear doors (Ref. 32-00-00, Servicing).

(2) Position access platform.

C. Remove

(1) Remove the six nuts (1), screws (2) and retain washers (3) for reinstallation.

(2) Remove elbow (4) by pulling it forwards.

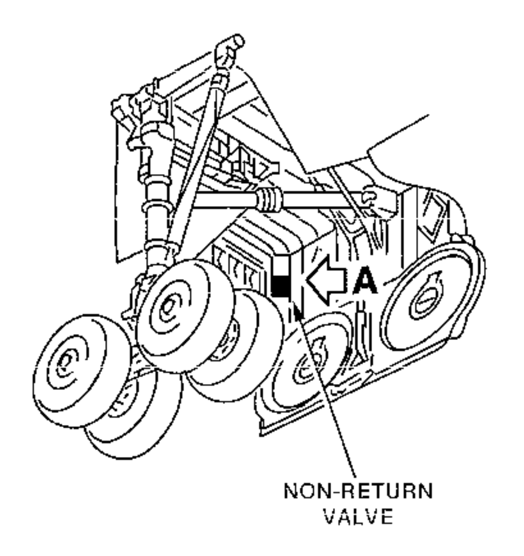
(3) Remove non-return valve (A506 or B506) by pulling it forwards.

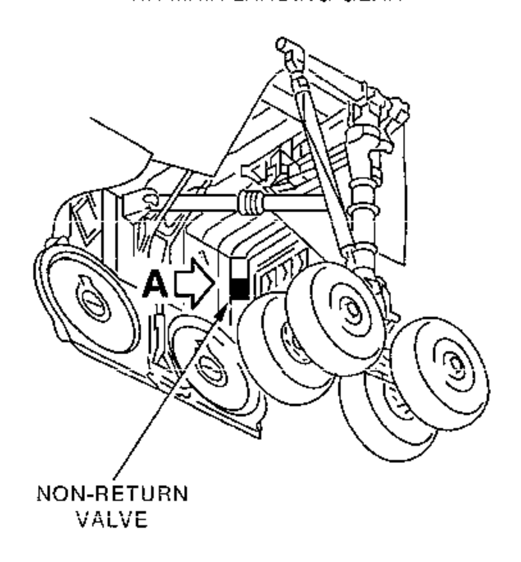
(4) If necessary, remove O-ring (5) from venturi (6).

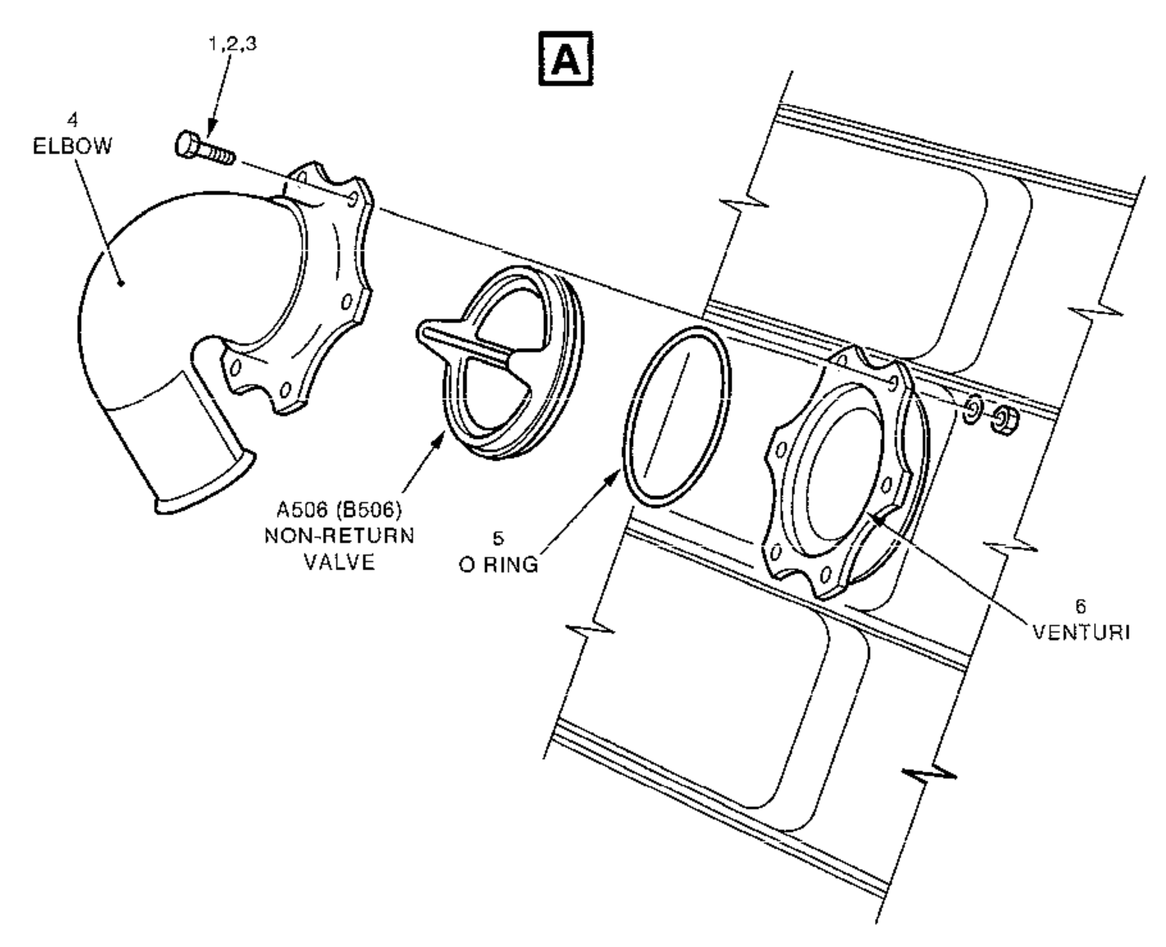
D. Preparation of Replacement Component

(1) Make certain that non-return valve is free from dents and distortion.

(2) Manually check that flaps are not jammed and that springs are compressed by the same load.







CMB 21 34 12 4 AAM0 00

Location of Main Landing Gear Bay Ventilation Valve
Non-return Valve
Figure 401

(3) Install a new O-ring on non-return valve A506 or B506 according to landing gear bay concerned.

E. Install

(1) Install valve A506 or B506 in venturi (6) housing.

NOTE: Two locating lugs enable quick positioning of valve in housing.

The air is discharged outwards.

(2) Install elbow (4) (discharge outlet towards the ground).

(3) Install the six screws (2), washers (3) and nuts (1).

(4) Tighten the six nuts (1).

CAUTION: MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

F. Close-Up

(1) Remove access platform.

(2) Close main landing gear doors (Ref. 32-00-00, Servicing).

RB

NOSE GEAR BAY VENTILATION NON-RETURN VALVE - REMOVAL/INSTALLATION

1. General
(Ref. Fig. 401)

The nose gear bay ventilation non-return valves are located in nose gear bay on RH pressure regulating and safety valve (for non-return valve A700) and on LH pressure regulating and safety valve (for non-return valve B700).
They are identical. Only their installation is different.

2. Nose Gear Bay Ventilation Non-Return Valve A700, B700

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 10 ft. 8 in. (3.25 m).	-
Corrosion-Resistant Steel Lockwire Dia. 0.041 in (1 mm)	-

B. Prepare

(1) Open nose gear doors (Ref. 32-00-00, Servicing).

(2) Position access platform.

C. Remove

(1) Remove non-return valve A700 (Ref. Fig. 402).

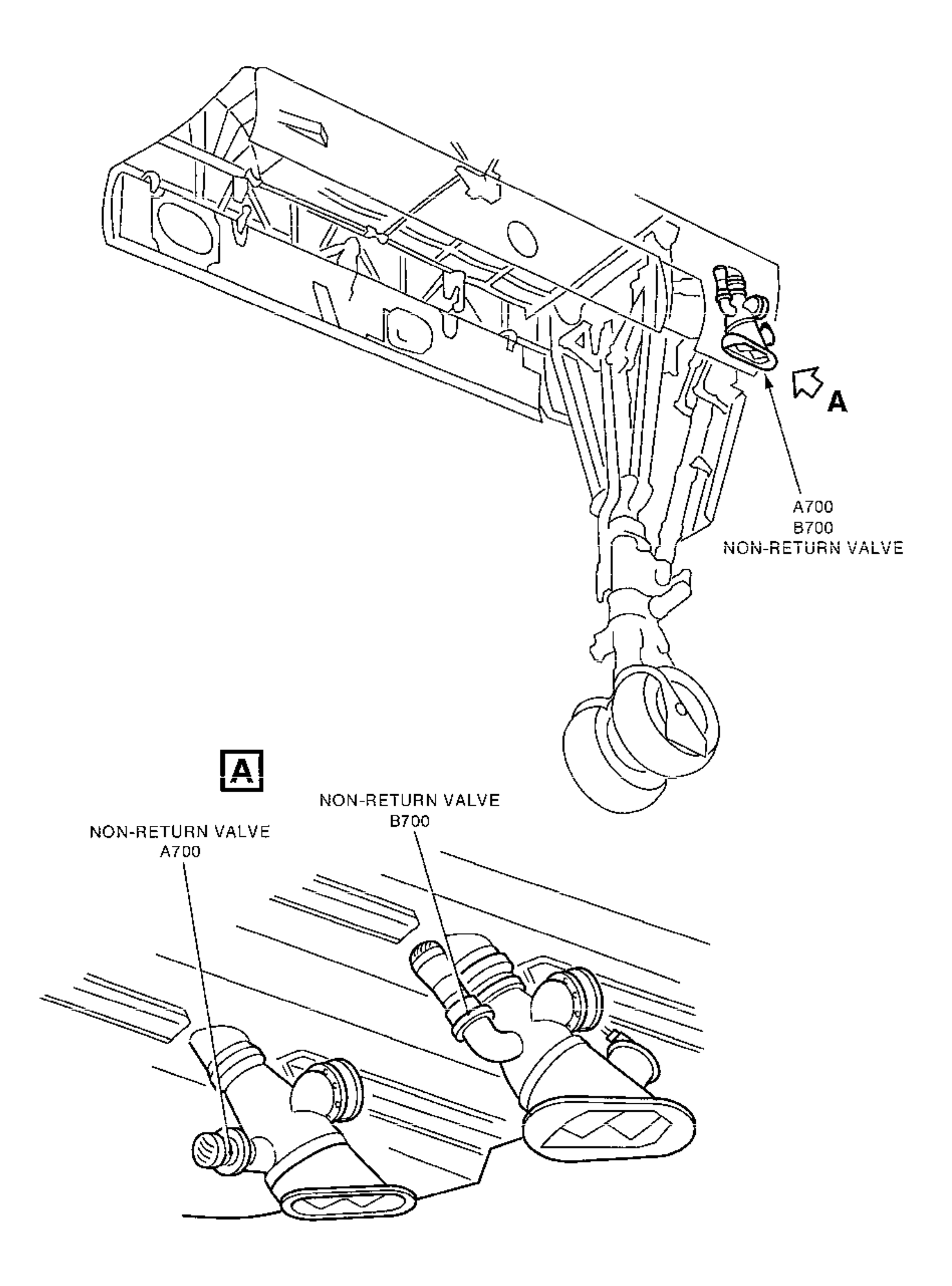
(a) Remove the six cotter pins (1).

(b) Remove the six nuts (2), hex bolts (3) and retain washers (4) for reinstallation.

(c) Remove non-return valve housing (5) by pulling forwards.

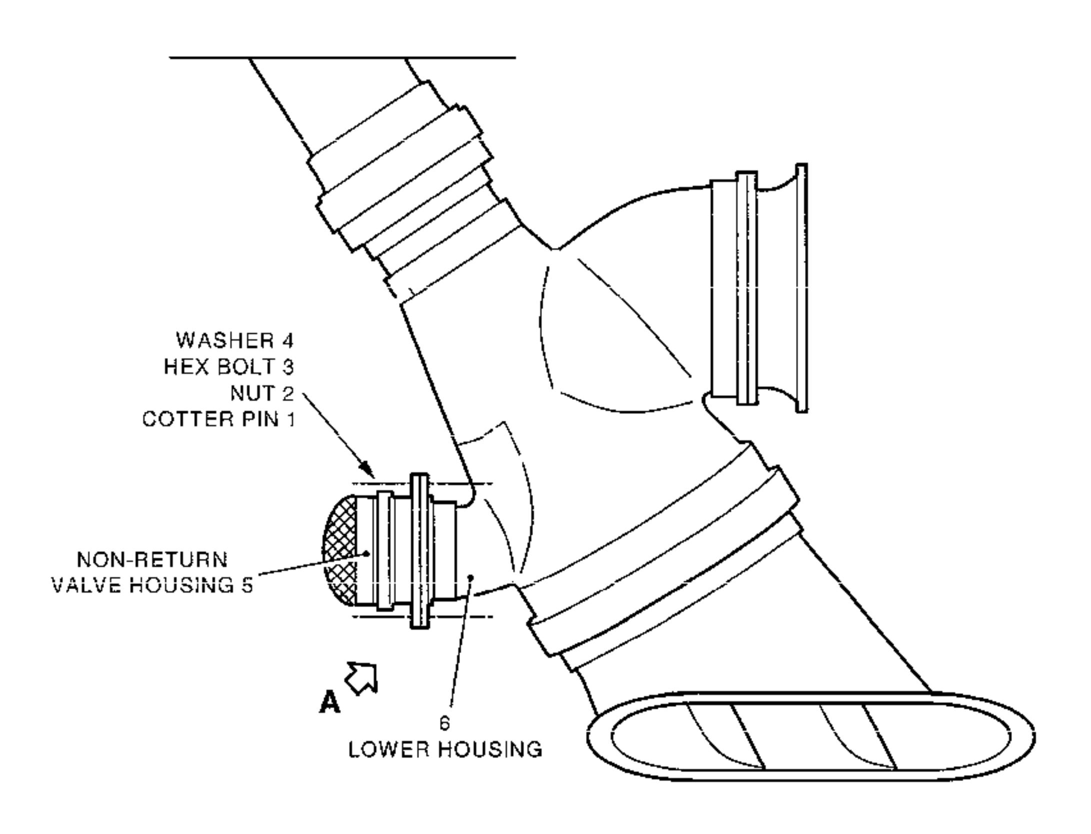
(d) Remove non-return valve A700 from lower housing (6).

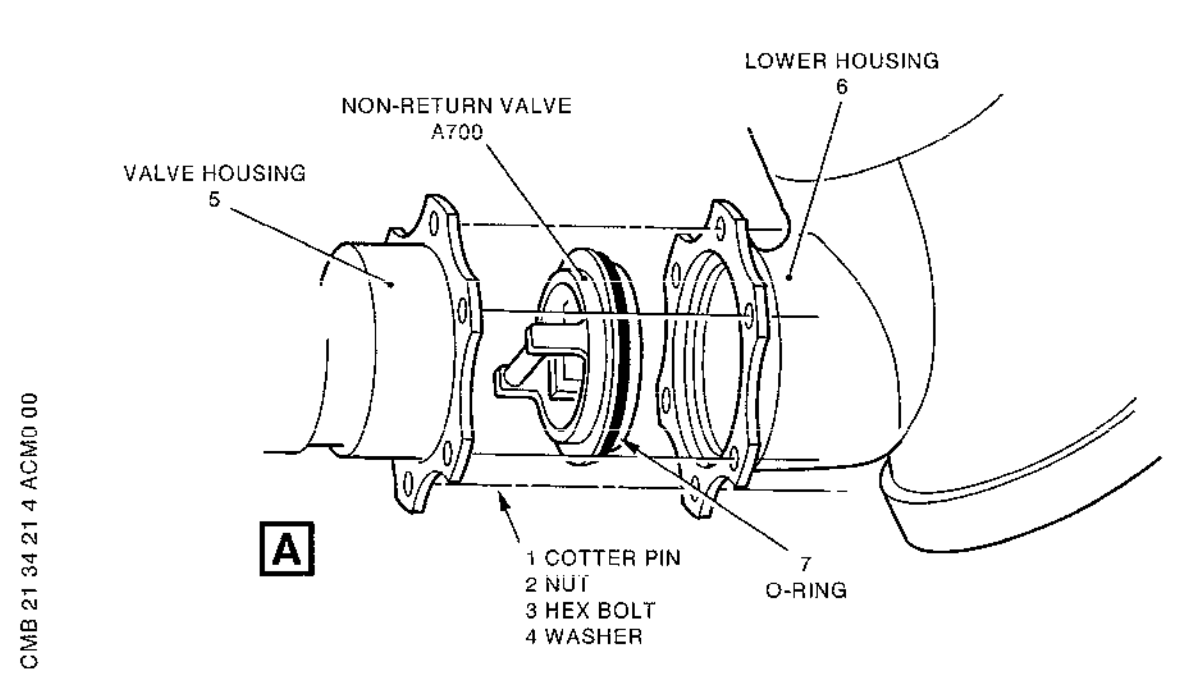
(2) Remove non-return valve B700 (Ref. Fig. 403)



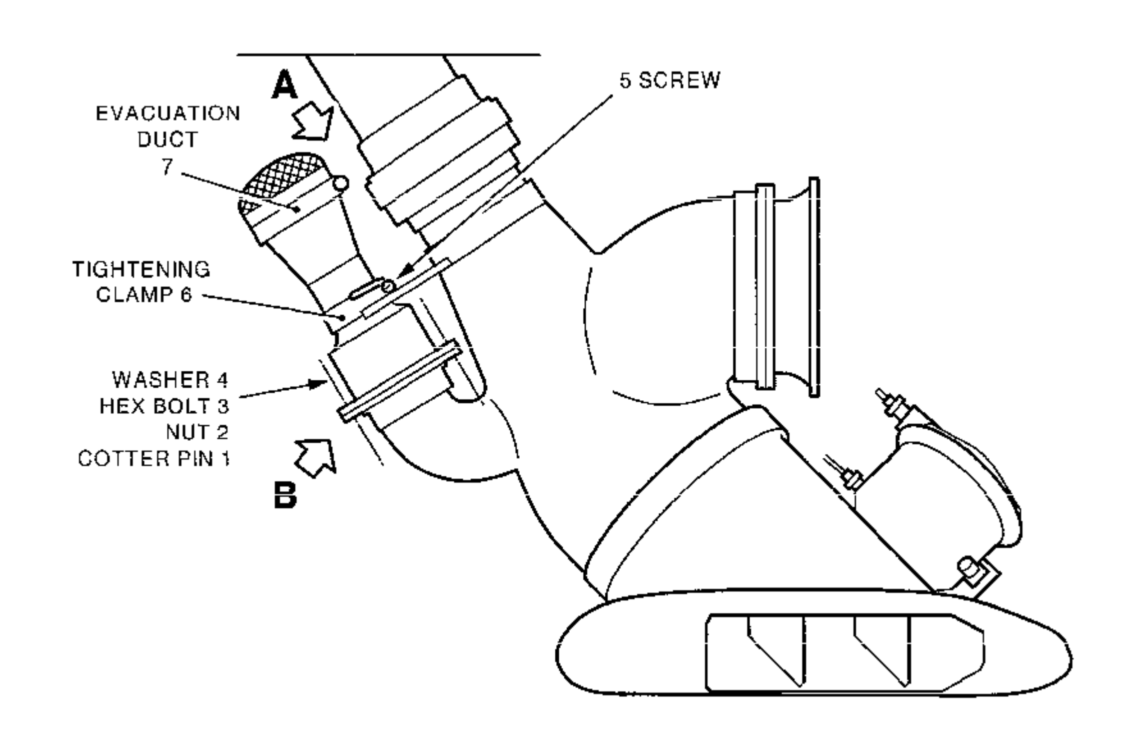
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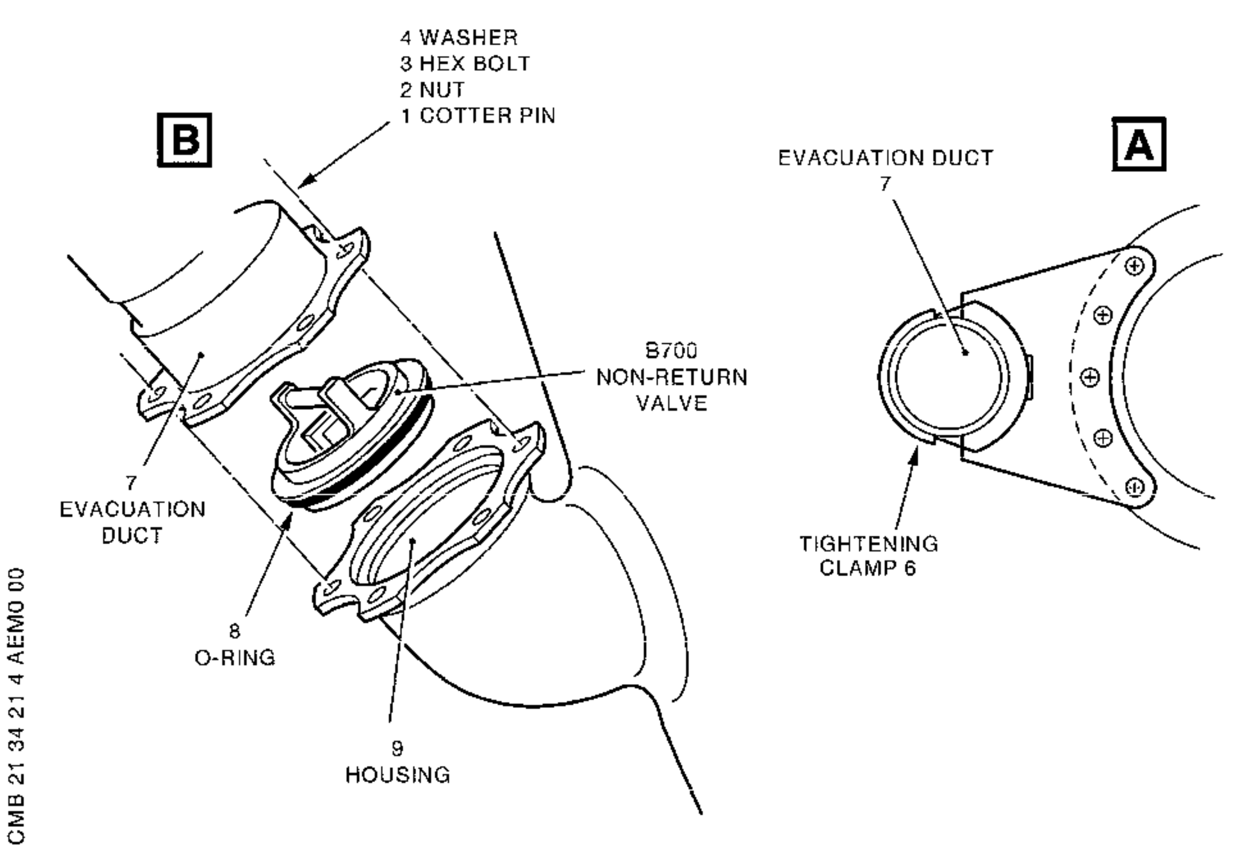
Location of Non-Return Valves A700 and B700
Figure 401





Installation of Non-Return Valve (A700)
Figure 402





Installation of Non-Return Valve (B700)
Figure 403

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(a) Remove the six cotter pins (1).

(b) Remove the six nuts (2), hex bolts (3) and retain washers (4).

(c) Cut lockwire, remove screw (5) and tightening clamp (6).

(d) Remove evacuation duct (7) by slightly pulling forwards.

(e) Remove non-return valve B700 from housing.

(f) If necessary, remove O-ring (8) from housing (9).

D. Preparation of Replacement Component

(1) Make certain that the replacement non-return valve is free from dents and distortion.

(2) Manually check that the valve moveable flaps are not jammed and that the force of each spring is identical.

(3) Install a new O-ring on valve.

E. Install

(1) Install non-return valve A700 (Ref. Fig. 402)

(a) Install non-return valve A700 in lower housing (6).

NOTE: Two locating lugs enable correct positioning of non-return valve housing.
The air flows outwards.

(b) Install non-return valve housing (5).

(c) Install the six hex bolts (3), washers (4) and nuts (2).

(d) Tighten nuts (2).

(e) Safety hex bolts (3) with cotter pins (1).

(2) Install non-return valve B700 (Ref. Fig. 403).

(a) Install non-return valve B700 in housing (9).

NOTE: Two locating plugs enable correct positioning of non-return valve in housing.

The air flows outwards.

(b) Install evacuation duct (7) on housing (9).

(c) Install the six hex bolts (3), washers (4) and nuts (2).

(d) Tighten nuts (2).

(e) Safety the six hex bolts (3) with cotter pins (1).

(f) Install tightening clamp (6), tighten screw (5).

(g) Wirelock the screw (5) with corrosion-resistant lockwire 0.041 in (1 mm) Dia.

F. Close-Up

<u>CAUTION</u>: MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(1) Remove access platform.

(2) Close nose gear doors (Ref. 32-00-00, Servicing).

RB

NOSE GEAR BAY VENTILATION NON-RETURN VALVE - INSPECTION/CHECK

1. General

   To check nose gear bay ventilation non-return valve for correct operation.

2. Test

   A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 10 ft 8 in (3.25 m)	-
Electrical Ground Power Unit	-

   B. Prepare

      (1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

      (2) On EQUIPMENT BAY cooling panel 2-211, make certain that MAIN FAN switch is in AUTO position.

      (3) Check that the airflow is correct on FWD FLOW MASS FLOW indicator.

   C. Check

      (1) Position access platform.

      (2) Check that the air flows at non-return valves A700 and B700 (Ref. 21-34-21, Removal/Installation, Fig. 401.

   D. Close-Up

      (1) Remove access platform.

      (2) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

PRESSURE CONTROL - DESCRIPTION/OPERATION

1. General

The cabin pressure control system consists of two semi-automatic systems, SYS1 and SYS2 which are identical and independent. In normal operation only one system is operating ; the other one is in stand-by.

Each cabin pressure control system consists of :

- A pressure regulating selector located on CABIN PRESSURE CONTROL panel.
R - A regulating and safety valve position indicator located on CABIN PRESSURE CONTROL panel.
- An amplifier located in electronics rack
- Two cabin pressure regulating and safety valves located under the cabin floor, one between frames 26 and 27, the other one between frames 74 and 75
- Two vacuum pumps (one per valve). These vacuum pumps enable correct operation of the regulating and safety valves when the differential pressure is low.

- An altitude switch causes aural and visual warnings to opera-
R te in the event of cabin excessive altitude. If the differential pressure reaches the upper or lower limit range, aural and visual warnings are triggered. A pressure switch causes the warnings to operate (the pressure switch is integral with each pressure regulating and safety valve). Only the forward valves (one for each system) are associated with these warnings.

R (Ref. Fig. 001)

2. Selector - Pressure Regulating, Automatic

A. Description (Ref. Fig. 002)

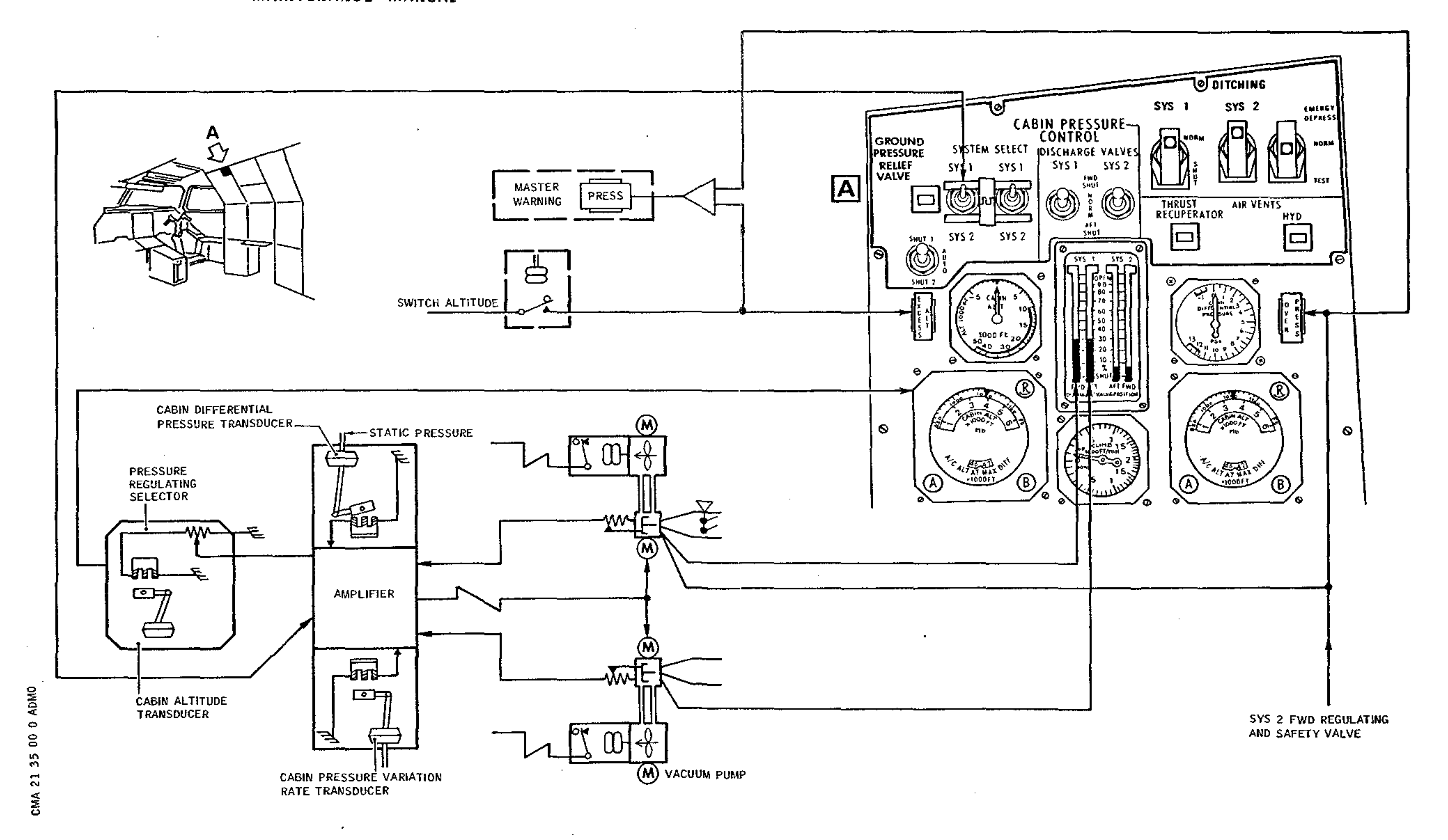
The pressure regulating selector allows selection of the cabin pressure altitude as well as of the maximum cabin pressure variation rate.
It consists of :

(1) A sensing device (an absolute pressure varying from 56 mb to 2053 mb (0.8 to 30 psi) can be safely applied on the manometric capsule).

(2) An absolute pressure transducer

It consists of an E transformer comprising a primary winding on a central core and secondary windings on

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Cabin Pressure Control
Figure 001

R

outer cores. A tilting I beam acts on the output signal from the secondary windings.
The sensing device is mechanically linked to I beam.
The capsule and transducer unit provide control of the selected cabin altitude.

(3) A potentiometer, allowing selection of the desired cabin pressure variation rate

It is provided with three control knobs on the front face. These knobs allow selection of the following parameters :

- Required cabin altitude during the various flight phases
- Required cabin pressure variation rate
- Correction of barometric pressure

The indications displayed on the front of panel are the following :

- Selection range of cabin altitude (from - 5 to + 10 ft x 1000)
- Selection range of cabin pressure variation rate from 200 to 1000 ft/min.
- Selection range of altimetric correction from 930 to 1100 mb.
- The aircraft flight altitude for which the cabin positive normal maximum differential pressure is reached is indicated with respect to the selected cabin altitude on the dial window.

The dial is provided with integral lighting.

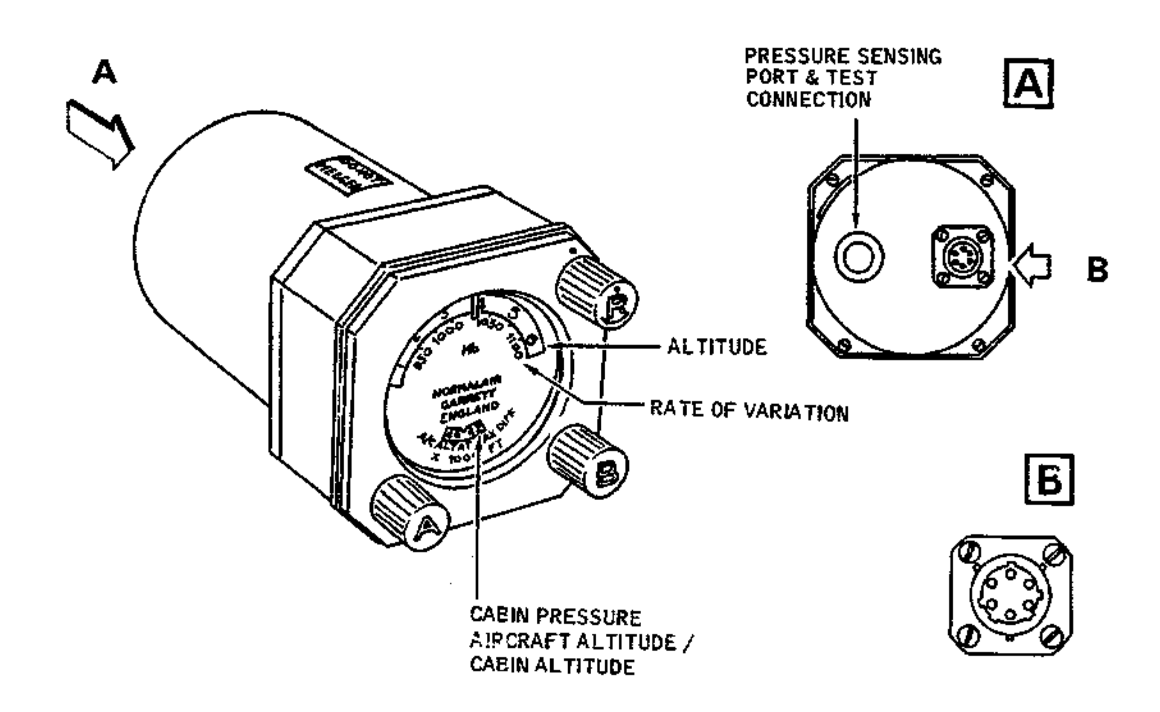
B. Operation
(Ref. Fig. 002)

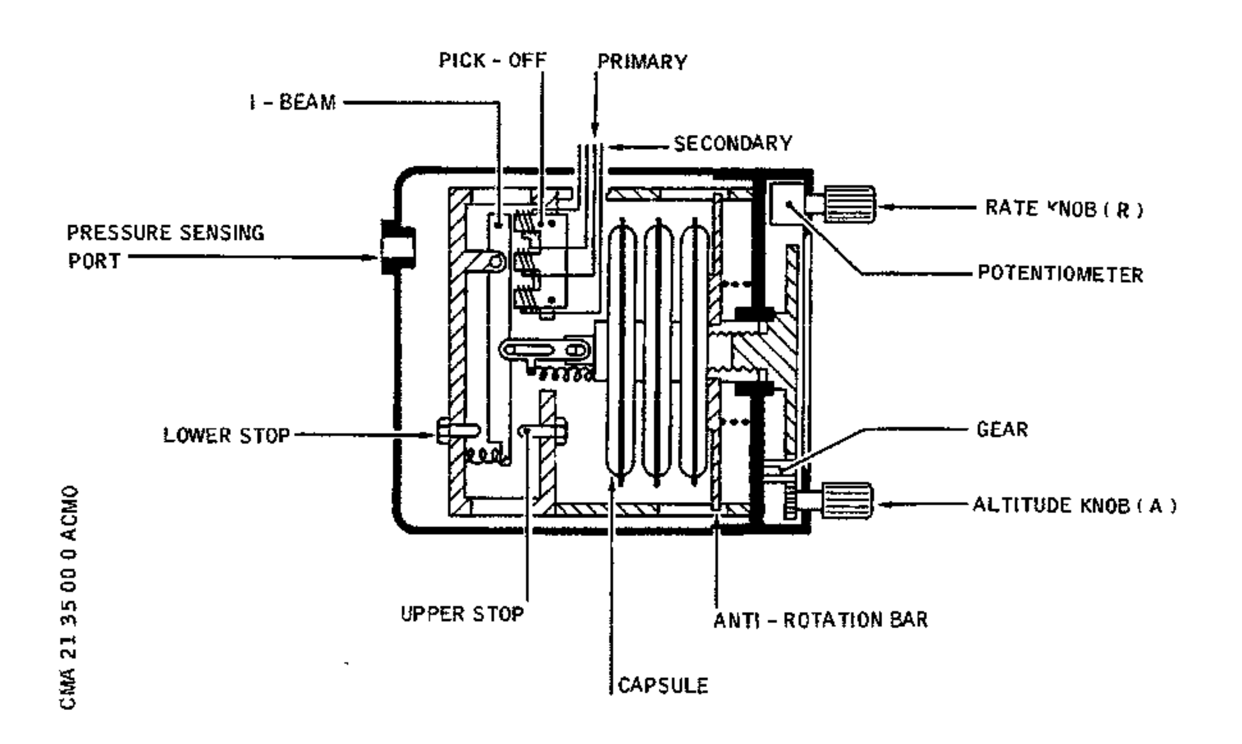
The barometric capsule can move in two ways :

(1) Longitudinal displacement of the whole capsule according to the rotation of the altitude knob (A).

(2) Expansion or contraction motion depending on the cabin altitude variation.

These displacements are transmitted to the I swiveling beam through a slotted rod. The amplitude of the transducer output signal depends on the I beam angle deflection.
This deflection is limited by means of mechanical stops on both sides of I beam.
When cabin pressure altitude equals the selected value, I





Automatic Pressure Regulating Selector
Figure 002

beam is in neutral position, half-way between the mechanical stops. The output signal from E pick-off secondary winding is sufficient (after amplification) to adjust the cabin pressure regulating and safety valves to the selected cabin pressure altitude.
When cabin pressure altitude is lower than the selected value, the capsule expands forward of the selector, causing I beam to move and E pick-off produces an electric signal in phase with main power supply.
When cabin pressure altitude is greater than the selected value, the capsule expands aft of the selector, causing I beam to move. E pick-off produces an out of phase signal.
I beam having reached the upper stop in the first instance, and the lower stop in the second instance, any further motion is taken up by the rod slots. E pick-off output signal is transmitted to the amplifier pack where it is summed with other signals, then amplified.
The resulting signal is again amplified, then rectified and supplies pressure regulating and safety valves torque motors which initiate the corrective action.
The capsule returns to its initial position, I beam returns to neutral position ; E pick-off output signal cancels and the amplifier supplies a signal to the pressure regulating and safety valve which half opens.
A RATE CONTROL potentiometer (R knob) acting on the output signal from the transducer secondary output enables selection of cabin pressure variation rate.

3. Indicator - Position, Regulating and Safety Valve

A. Description
(Ref. Fig. 003)

The purpose of this indicator is to indicate the position of the regulating and safety valves ; their position is indicated by means of tapes moving vertically along graduated scales which makes an easy and quick comparison of the information possible.
Each tape has two colours, white and black, and the line separating the two colours represents the index. When the indicator is not supplied with 115 V, 400 Hz, the index of both valves returns to SHUT.
When an amplifier fails, the index of the corresponding tape returns to SHUT.
A striped area on the tape is displayed at the upper part
R of the window on the corresponding tape(s). The dial has integral lighting.
The indicator consists of :

- Four identical electro - mechanical modules
- Four identical electronic modules
- A chassis
- A case assembly

(1) Electro Mechanical Module
It consists of a two-phase motor (B1) which drives :

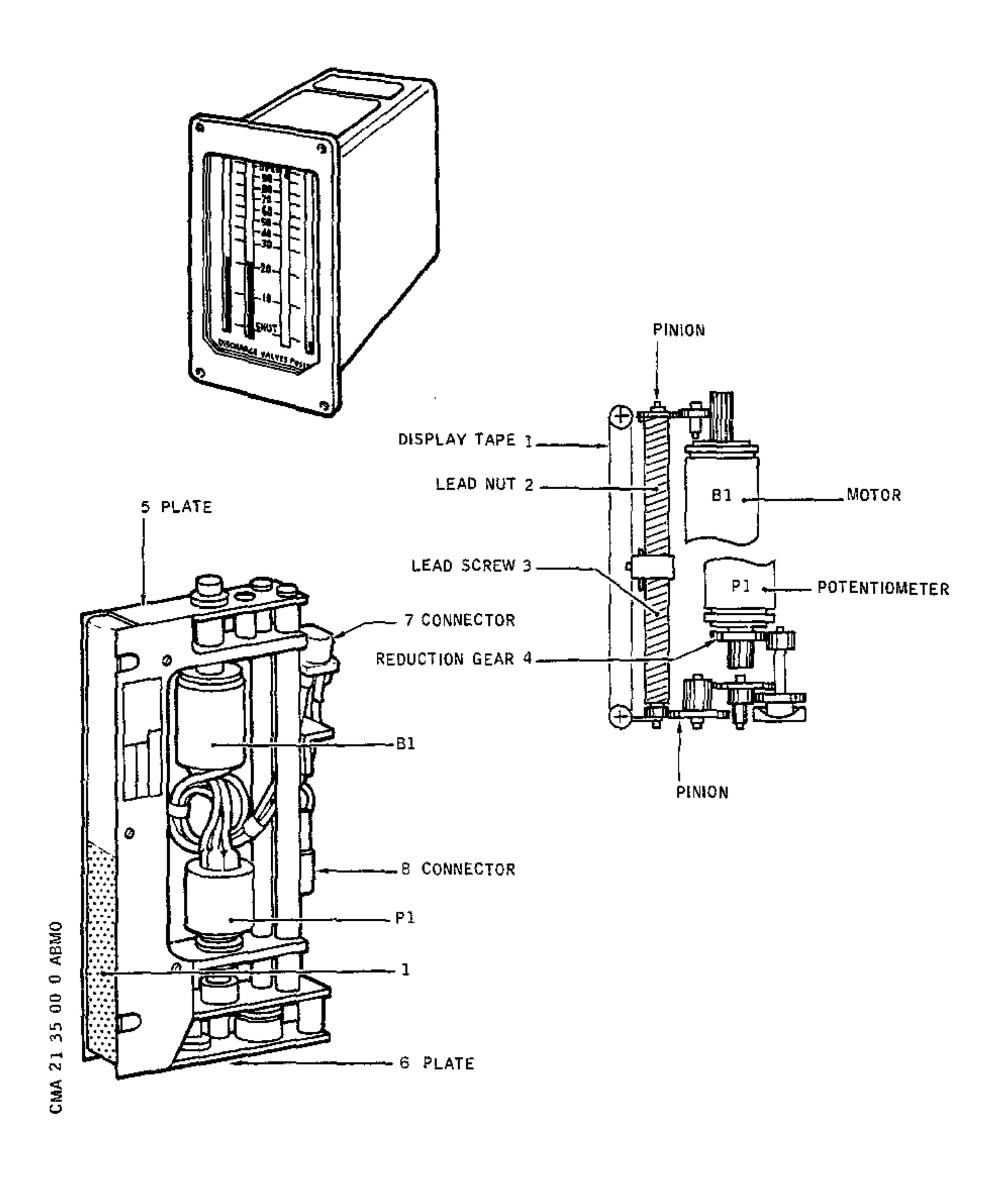
- The display tape (1) via leadscrew (2) and lead nut (3)
- The potentiometer (P1) via a reduction gear (4)

Leadscrew (2) pivoted between plates (5) and (6) carries a pinion and a stop at each end.
Leadnut (3) runs on the leadscrew when the latter is rotated and drives the display tape.
The potentiometer (P1) shaft carries two gear wheels meshing with the pinion via a reduction gear.
The indicator is provided with electrical connectors (7) and (8)

(2) Electronic module
(Ref. Fig. 004)

Each module is protected by an insulating sleeve and located in a case.
It consists of :

- A 115 V. 400 Hz transformer (T1) with two secondary
R outputs and an intermediate tap on the primary win=



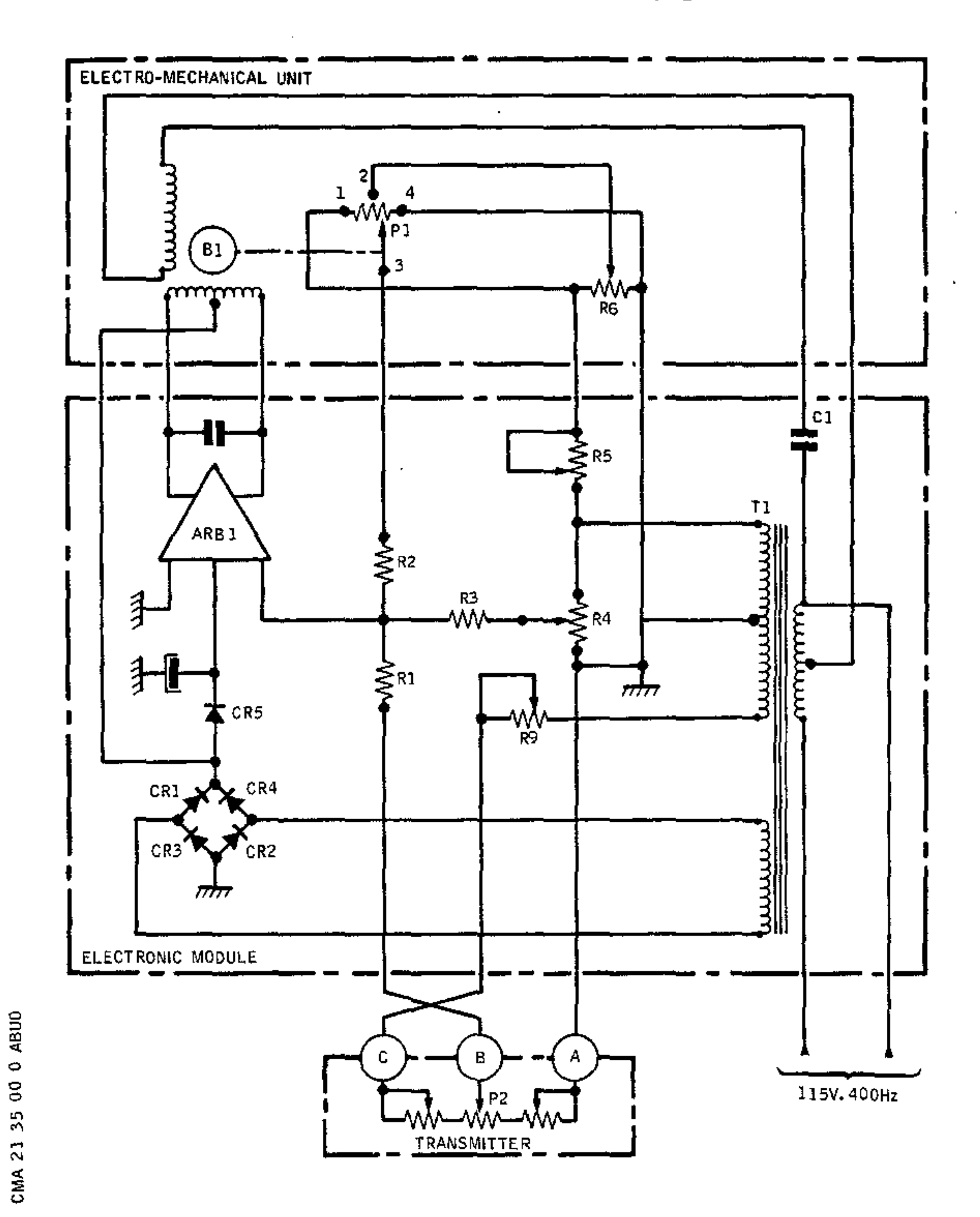
Electro Mechanical Module
Figure 003

ding
R - A capacitor (c1) dephases by 90° the primary winding voltage required to supply the fixed phase of the motor winding (B1)
R - An ARB1 type amplifier.
- A 30 VDC supply for the amplifier
- An input circuit consisting mainly of 3 adjustable
R resistors R4, R5, R9, and 3 summing resistors.

The electronic and electro mechanical assemblies are located in a casing, attached to the chassis.
The assembly is provided with a seal. Indications on the indicator dial are visible through a glass on the front of the casing.
Two electrical connectors are located at the rear part of the casing.

B. Operation

The regulating and safety valve position indicator consists of 4 servo channels which are exactly identical in operation
Each channel operates with a position transmitter (P2). The potentiometer shaft is integral with the regulating and safety valve and enables indication of the valve position.
Voltages on P1 and P2 are compared by means of summing resistors R1 and R2. However, as the voltage at P2 wiper is not null when the regulating and safety valve is completely closed, it is balanced by an equal voltage ; these two voltages are in amplitude and phase opposition, and are generated by adjustable resistor R4 and summed by resistor R3.
The resulting voltage obtained at the junction of summing
R resistors R1, R2, R3 is fed to the amplifier ARB1 input and amplified ; it supplies the control phase of the motor B1.
The motor drives the indicator display tape and potentiometer P1 shaft until voltages at P2, R4 and P1 wipers are cancelled.
The mechanism is then immobilized.



CMA 21 35 00 0 ABU0

Regulating and Safety Valve Position Indicator - Schematic
Figure 004

4. Amplifier

A. Description
(Ref. Fig. 005)

The amplifier pack, associated with pressure regulating selector, constitutes the cabin pressure regulating and safety electrical control element.
It consists mainly of three assemblies fitted in a case.
These assemblies are :

- A rate transducer
- A differential pressure transducer
- An electronic control assembly

(1) Rate transducer
(Ref. Fig. 006)

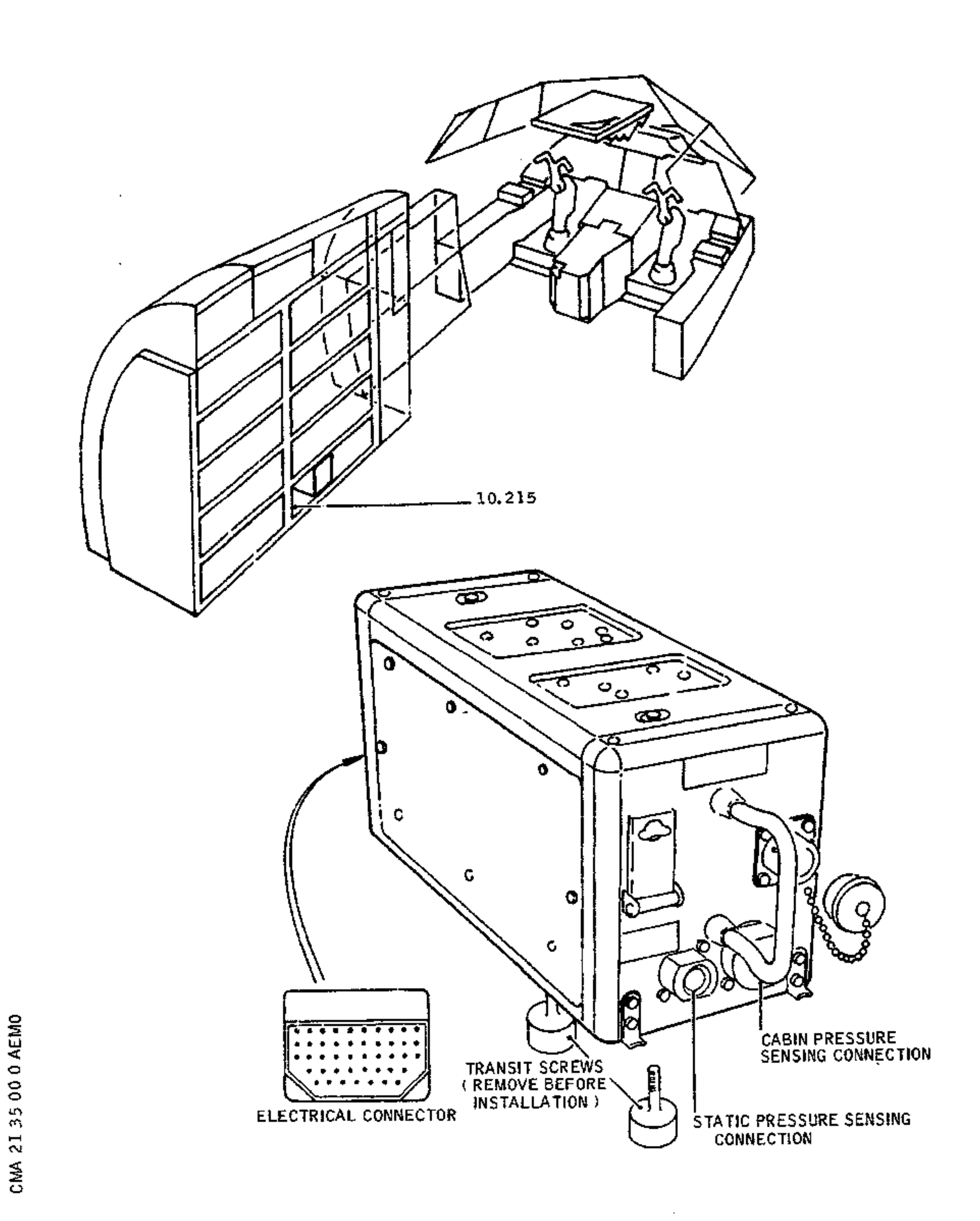
The rate transducer consists of an E and I transformer whose voltage depends on the position of the two element differential capsule which is also included in the assembly. Capsule expansion or contraction results in I beam tilting about its pivot. Adjustable stops limit the angular movement of the beam.
Cabin pressure reaches the interior of the capsule through a hose. The transducer and capsule assembly is contained in a cover. The interior of the cover is subjected to ambient pressure, which is also cabin pressure. However, the transmission of pressure change into and out of the interior of the cover is limited by means of a fixed needle valve.

(2) Differential pressure transducer
(Ref. Fig. 006)

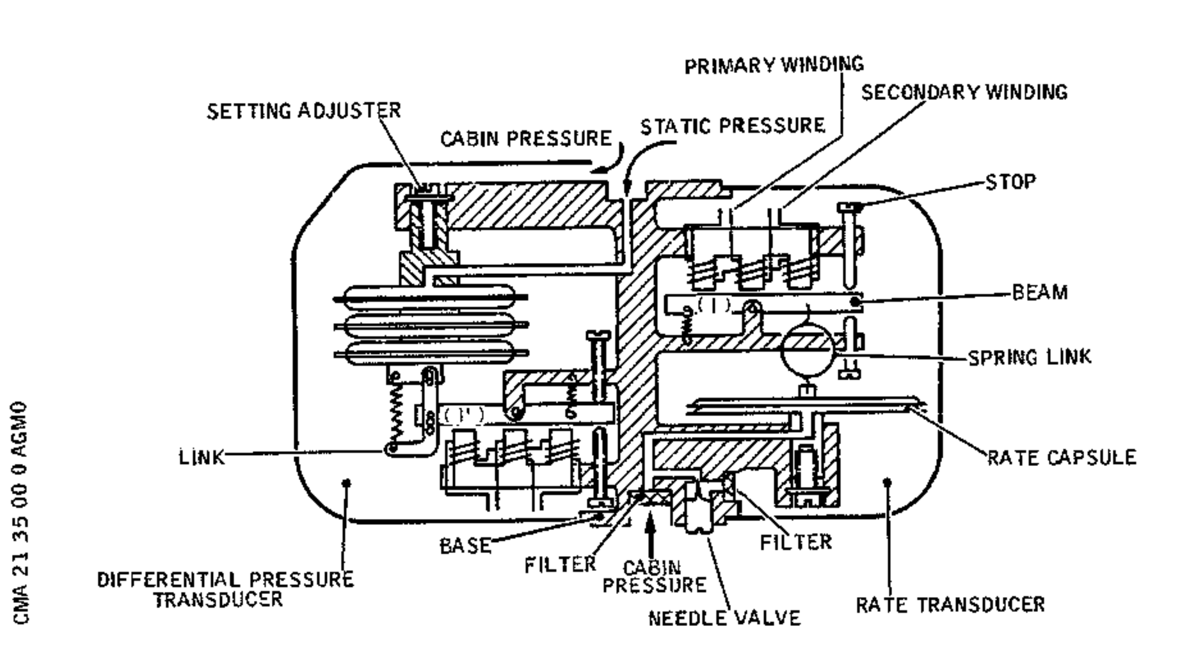
This transducer is almost similar to the one described above. The main difference is that the capsule is provided with three elements linked to the I beam by a mechanism with take up slot.

(3) Electronic Assembly

The main electronic assembly consists of two prin-
R ted circuit boards which, together with the power unit, are fitted in the upper part of the case. The amplifier pack electrical connections are made through a 45-way plug at the rear of the case. On the front face, a 19-way plug allows connection of a test and monitoring set. A GRD TST SWT switch enables the variation rate transducer and the pressure regulating selector to be electrically isolated to allow monitor-



Amplifier
Figure 005



Transducer Assembly - Schematic
Figure 006

ing and check of differential pressure control during ground tests.
Ground logic circuits reduce the effects of pressure surges resulting from the change of aircraft attitude during take-off phase. These circuits allow a slight pressurization of the aircraft during the take-off run as well as a depressurization of the aircraft on landing by ensuring that the pressure regulating and safety valves are fully open.

B. Operation

(1) Transformers/Transducers

Both transformers E and I operate according to the same principle. The voltage induced into each secondary winding depends on the gap between the I beam and the core. When the gaps are equal, the induced voltage is of the same amplitude but of opposite phase. When summed, the resulting voltage is null. When the I beam tilts about its pivot in either direction, the signal amplitude increases in one winding and decreases correspondingly in the other. The output voltage depends on the angle of tilt and the phase relation-
R ship to the primary supply depends on the direction of tilt. On each beam, two screw stops limit the amplitude of displacement in either directions.

(2) Rate Transducer
R (Ref. Fig. 006)

In at rest condition, the beam is parallel to its
R support. The secondary output voltage is zero.
On selection of a higher cabin altitude on the pressure regulating selector, cabin pressure diminishes immediately inside the rate capsule. In the exterior of the capsule, this decrease in pressure is delayed by the needle valve of the case. The capsule contracts, moving the I beam, which generates an electrical signal amplified in the electronic assembly and then used for the opening of the pressure regulating and safety valves.
Cabin altitude increases regularly, the output signal decreases to reach zero as the cabin reaches the selected altitude.
The process is reversed when reducing cabin altitude.

(3) Differential pressure transducer
R (Ref. Fig. 006)

At rest condition, the beam is parallel to its support.

The output voltage is zero. Static pressure acts on the interior of the capsule and cabin pressure on the exterior. When cabin differential pressure increases, the capsule contracts. When the maximum differential pressure is reached, the I beam moves.
The resulting output signal is amplified and used to open the pressure regulating and safety valves.

(4) Electronic assembly
(Ref. Fig. 007)

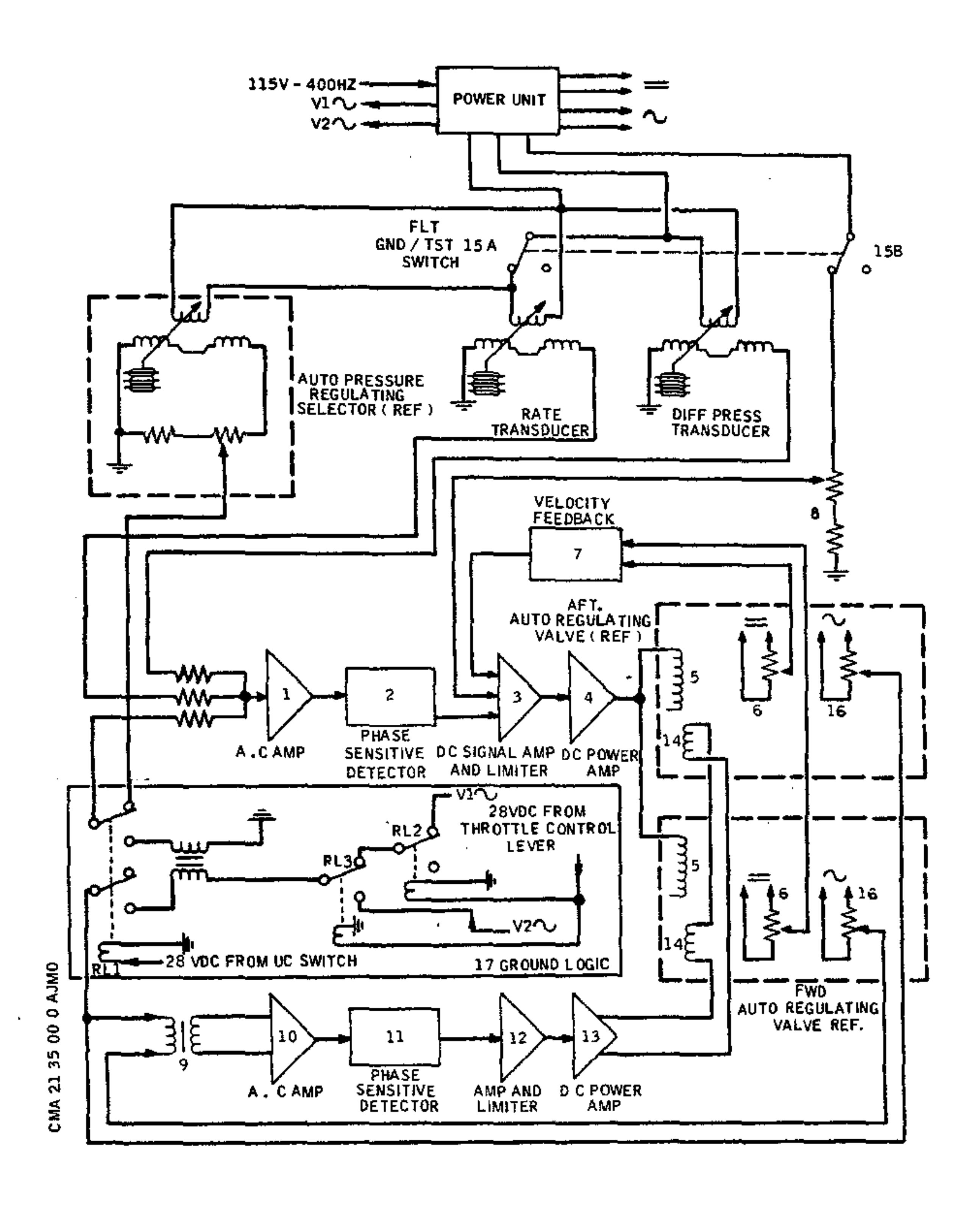
During normal flight, there is no output signal from the differential pressure transducer. The output signals of the pressure regulating selector and of the rate transducer are of opposite phases ; they are summed in (1), rectified in (2) further amplified and limited in (3) before being fed into the final power amplifier (4).
The output signal energizes the main windings connected in parallel with the pressure regulating and safety valve torque motors.
The power unit supplies a direct current to the torque velocity feedback potentiometers (6) coupled with each pressure regulating and safety valve.
The potentiometer resistor output signals are transmitted to (7) to give a velocity feedback which is added to the main control signal at the input to the amplifier and limiter stage (3).
At this stage a constant signal is added; it stabilizes quiescent current (8).
The power unit supplies an alternative current of 19 volts to the potentiometers regulating the airflow rate through each pressure regulating and safety valve.
The output voltages from the two moving elements of the
R potentiometer are fed to a transformer (9)and an alter-
R native current amplifier (10), then to a phase sensitive detector (11), a limiter amplifier (12) and an alternative current amplifier (13). The output current from the power stage feeds the control windings (14) in the torque motors of the pressure regulating and safety valves. These control windings are interconnected in series and in opposition and the resulting signal interacts with the signal from the main windings to control the pressure regulating and safety valves. This system is designed so that the two valves control and regulate the discharge air flow in the ratio 4.2/1 (forward to aft). The valve control signal is limited so that if one valve fails closed, the other remains under control, and vice versa.
The FLT G TST switch (on the amplifier front panel) enables the maximum differential pressure control

to be tested on the ground. When the switch is set to G TST, the (differential pressure and rate) transducers, the pressure regulating selector and the quiescent bias are no longer energized (cutting off by means of 15A-15B)

The ground logic circuit (17) consists of three relays (RL1-RL2-RL3). These relays are controlled by the landing gear and throttle control circuit.

During normal flight, relays 1 and 2 are not energi-
R zed. On the ground, relay RL1 is energized. The power
R unit provides a reference signal (V1) which replaces the signal from the cabin pressure regulating selector. This signal V1 is such that it ensures that the pressure regulating and safety valves are fully open, regardless of the selections displayed on the pressure regulating selector.

R When the throttles are fully open, RL2 and RL3 are
R energized, the power unit provides a signal (V2)
R ensuring that both the forward and aft pressure
R regulating valves move towards the closed position
R during the take-off run.



R

Amplifier Block Schematic
Figure 007

R 5. Valves - Regulating and Safety

A. Description (Ref. Fig. 008)

Each valve comprises the following components :

(1) A fixed body consisting of :

- A valve housing
- A base forming the valve seat and its attachment flange
- A valve guide attached to the base by radial ribs.

(2) Two movable assemblies consisting of :

- A valve, its guide rod and upper diaphragm
- A deflector, its guide rod and lower diaphragm
- The valve is returned to its seat by a spring.

(3) The control components consisting of :

- A torque motor, its double acting quadrant shaped valve and valve ports "a" and "b".
- 3 potentiometers transmitting the valve position and two adjustment potentiometers
- A cabin accidental maximum pressure altitude limiter and its port "c"
- A cabin positive accidental maximum pressure limiter and its port "d".
- R R R R A poppet valve associated with the limiter, the function of which is to limit the upper chamber over-pressure, thus the cabin negative maximum differential pressure.
- A cabin negative maximum differential pressure limiter
- A cabin air filter in the control area fitted with a check valve
- A valve closing mechanism in the event of ditching
- A valve re-closing electrovalve.

The valve casing and the upper diaphragm limit the upper chamber to pressure P1.

The valve, the deflector and the lower diaphragm limit the lower chamber to pressure P2.

The upper chamber communicates with the cabin through port "a" and a filter.

B. Operation
(Ref. Fig. 008)

(1) Cabin Pressure Control

When the torque motor is not energized port "a" is open and port "b" is closed.

Pressure in chamber P1 equals cabin pressure. Pressure in chamber P2 equals cabin pressure. The valve is returned to its seat by its spring and is closed.

Donwstream of port "b", the duct is linked to the vacuum pump and to the cabin air discharge duct. Pressure in the pipe is lower than cabin pressure.

The partial opening of port "b" gives a decrease in chamber P1. The differential pressure between P1 and P2 gives controlled opening of the valve.

The three potentiometers have the following functions :

- Back signal to amplifier
- Comparison signal for the opening of the two valves
- Valve position indication at Flight Engineer's station.

(2) Limitation of Cabin Accidental Maximum Pressure Altitude

The accidental maximum pressure altitude limiter comprises :

- An aneroid capsule subjected to cabin pressure
- A valve, its seat, and a port.

When the limiter reaches the adjusted value, the capsule expands, the valve lifts off its seat and cabin air is admitted into the upper chamber P1. The valve closes either partially or fully so that cabin altitude is limited to the adjusted value. The maximum section of the port is sufficient to cause the valve to close whatever the opening of the other air discharge ports of the upper chamber.

(3) Limitation of Cabin Positive Accidental Maximum Differential Pressure

The cabin positive accidental maximum differential pressure comprises :

- A spring loaded diaphragm
- A valve, its seat and its port

- An electrical contact

One face of the diaphragm is subjected to static pressure of the fuselage outside wall and spring loading ; the other to cabin pressure.
When the assembly reaches the adjusted value, the effort acting on the face subjected to cabin pressure exceeds the effort acting on the diaphragm face subjected to outside static pressure.
The valve lifts off its seat, upper chamber air is discharged through the port, the valve opens. An electrical contact triggers an indication at flight compartment.

(4) Limitation of Cabin Negative Maximum Differential Pressure

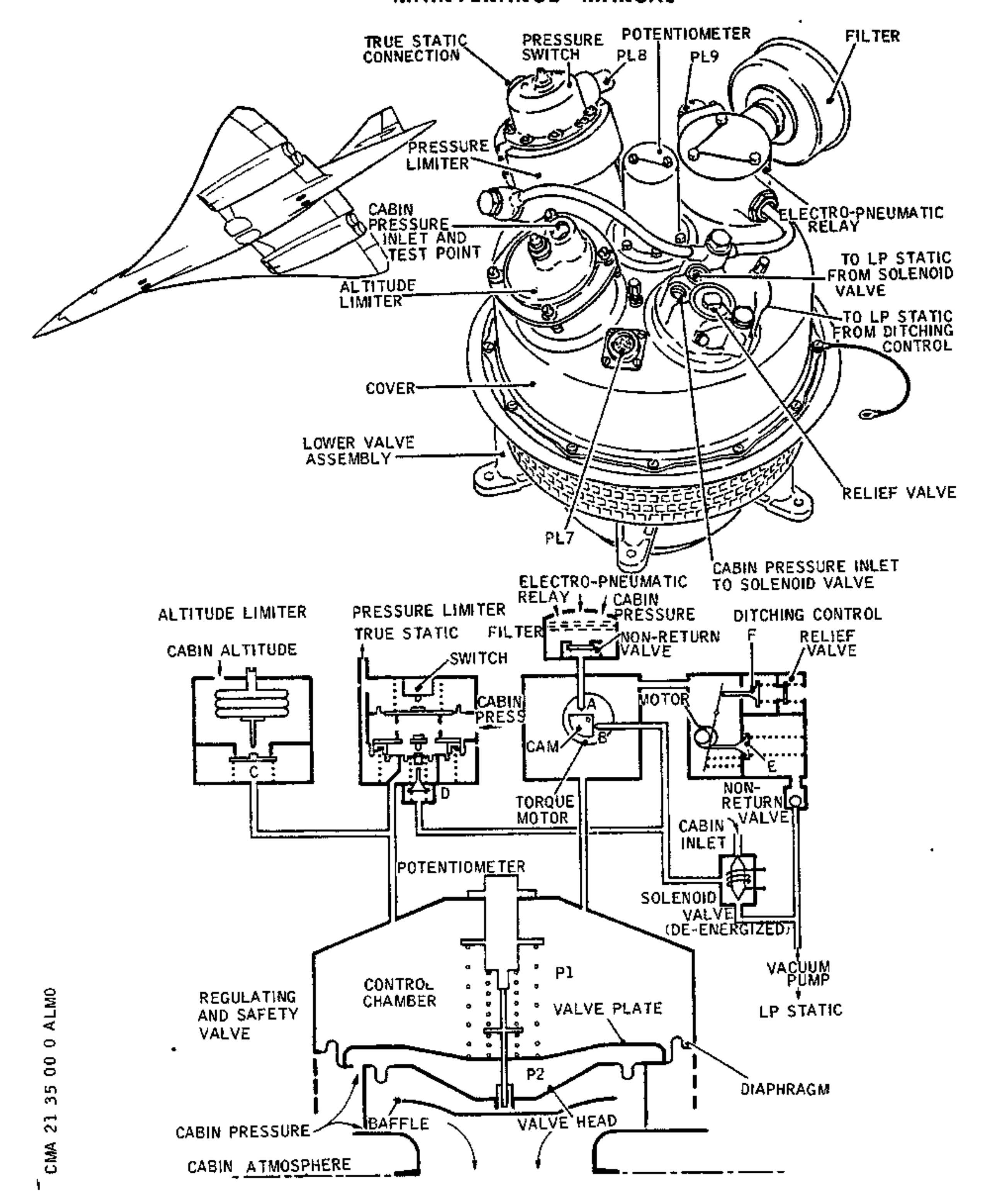
When outside static pressure exceeds cabin pressure, the lower diaphragm presses against the valve lower wall. The valve is then subjected to cabin pressure and return spring action as well as to outside pressure.
When outside overpressure is sufficient to balance the return spring action, the valve opens.
A poppet valve limits any pressure increase which may occur as a result of the spring contraction.

(5) Ditching Mechanism

The ditching mechanism consists of :

- An electric motor
- A cam
- A poppet blanking valve "F"
- A valve E which connects the low pressure pipe with chamber P1
- End-of-travel contacts

When DITCHING VALVES switch is placed in SHUT position, the motor is energized.
The valve "F" closes
The valve "E" opens
The contacts stop the motor.
Water fills the low pressure pipe, the vacuum pump and chamber P1.
Water pressure closes the valve.
R In normal flight, when DITCHING VALVES switch is placed SHUT position, a check valve prevents communication of the static pressure with the control chamber. The valve provides normal control and negative differential pressure limitation safety only is not provided.



Cabin Pressure Regulating and Safety Valve
Figure 008

(6) Closing Electrovalve

Reclosing Electrovalve

The electrovalve is not energized in normal operation.

It ensures the free passage of air in the low pressure pipe between chamber P1 pressure and static pressure.

When the electrovalve is energized, it shuts off the low pressure pipe and admits cabin air into chamber P1. When the pressure between P1 and P2 is equal, the valve closes under spring action.

6. Pumps - Vacuum

A vaccum pumps is associated with each regulating and safety valve. The function of the vacuum pumps is to create a negative pressure in the valve control chamber in order to obtain the force required to provide correct operation of the regulating and safety valves, especially on the ground.
They are controlled by a pressure switch integral with each valve.

A. Description

(1) Aft valve vacuum pumps.
(Ref. Fig. 009)

Each vacuum pump consists of :

- An electric motor supplied with 115 V, 400 Hz
- A centrifugal turbine installed at the end of the engine shaft.
- A turbine engine casing provided with an air inlet and outlet.
- A pressure switch.

After SB 21-041 For A/C 001-007,

(1) Aft Valve Vacuum Pumps (Ref. Fig. 010)
Description of aft valve vacuum pumps is identical to that described in paragraph 6. A. (2).

(2) Forward valve vacuum pump.
(Ref. Fig. 010)

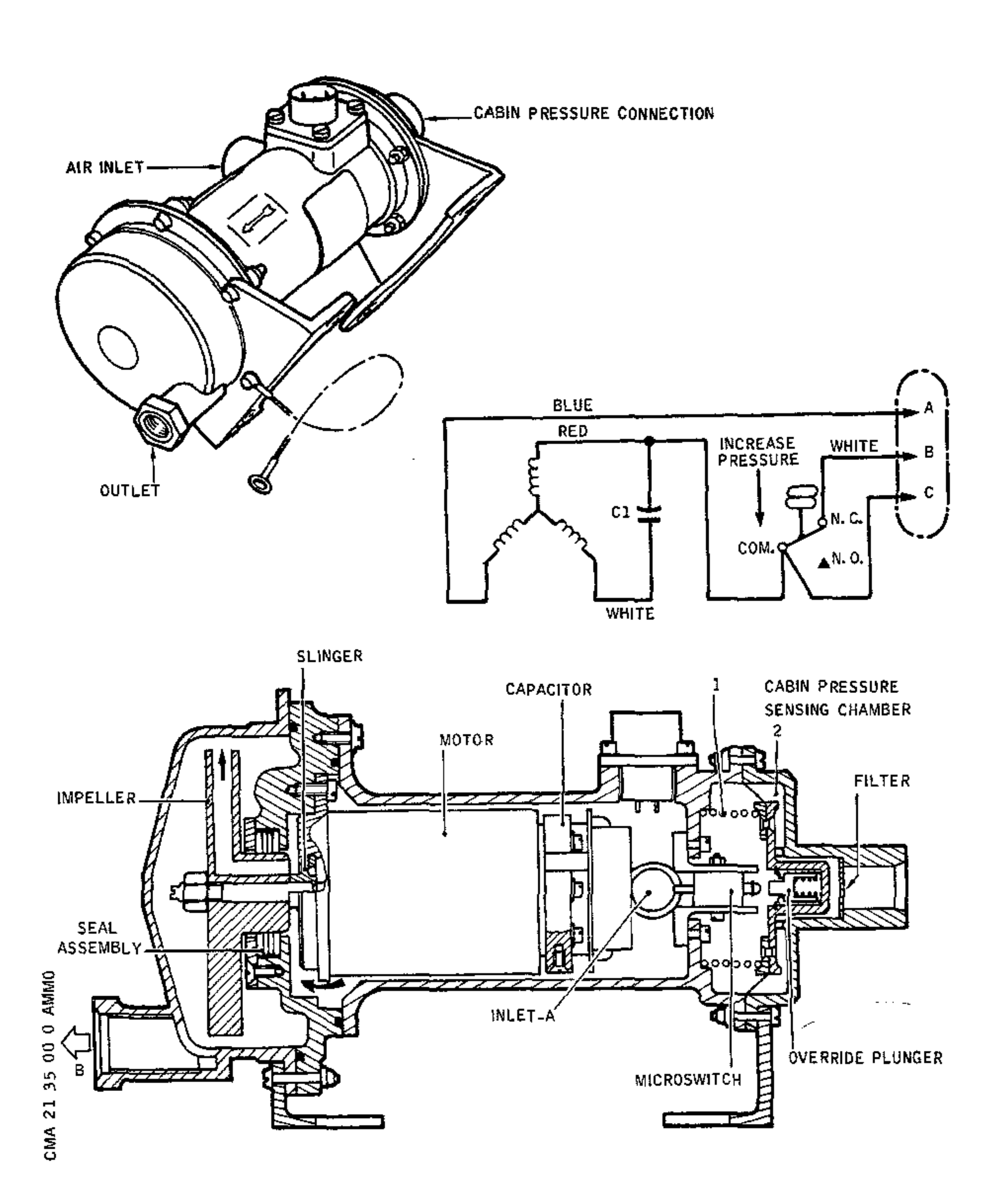
Each vacuum pump consists of :

- An electric motor supplied with 115 V, 400 Hz
- A centrifugal turbine installed at the end of the engine shaft.
- A turbine engine casing provided with an air inlet and outlet and a static pressure connector.
- A pressure switch.

B. Operation

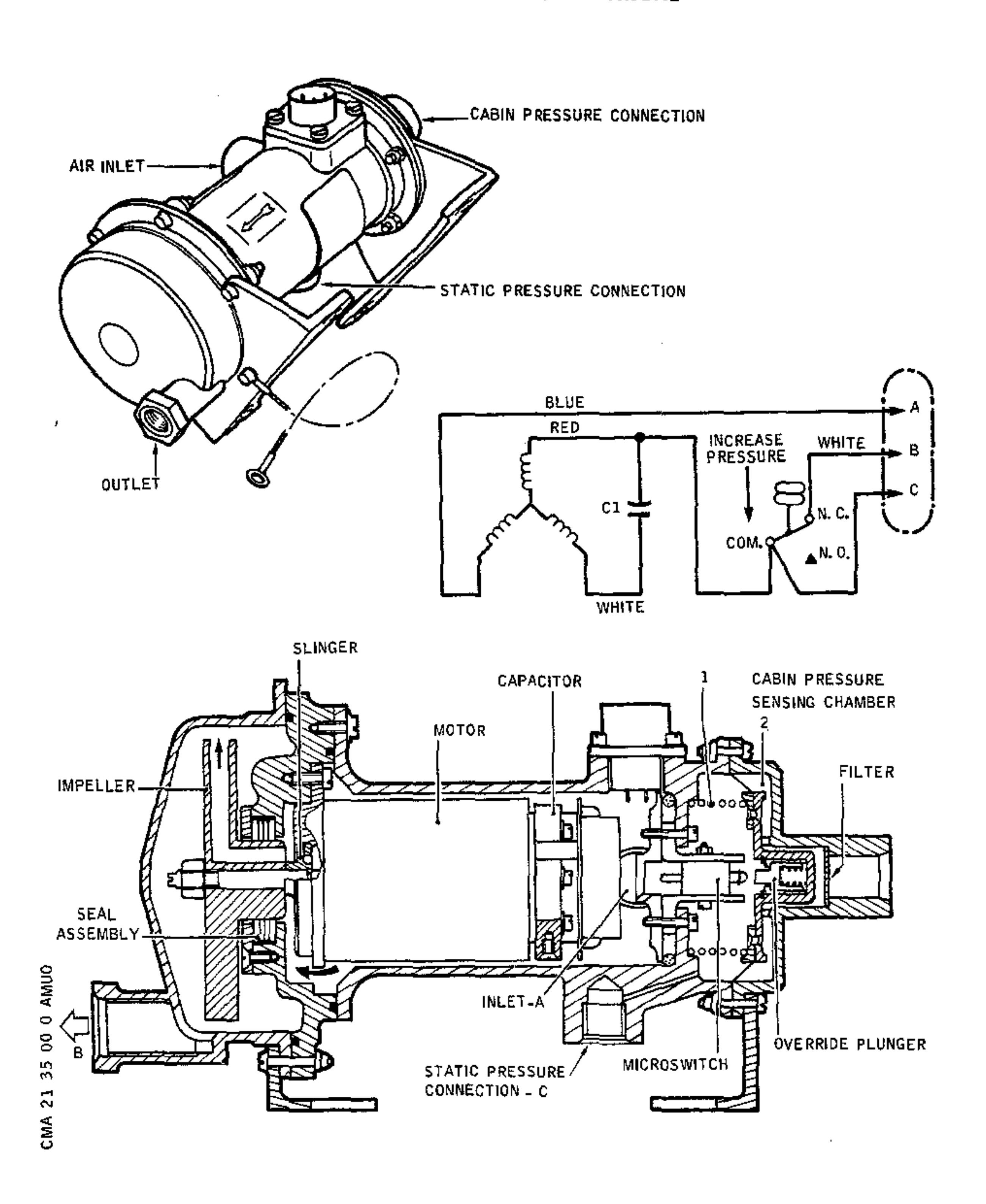
(1) Aft valve vacuum pumps
(Ref. Fig. 009)

The electric motor is supplied when the differential pressure between chamber (1) and (2) of pressure switch
RB is lower than 2 ± 0.3 psi (145 ± 20 m bars).



R

Aft Valve Vacuum Pumps
Figure 009



R

Forward & Aft Aft Valve Vacuum Pumps
Figure 010

The centrifugal turbine creates a negative pressure inside the motor housing which is connected to the regulating and safety valve.
The air is bled inside the valve control chamber ; it is sucked in by orifice A in vacuum pump then discharged through orifice B and safety valve discharge nozzle. The vacuum pump stops operating when the differential pressure inside the pressure switch is
RB greater than 2 ± 0.3 psi (145 ± 20 m bars).

After SB 21-041 For A/C 001-007,

(1) Aft Valve Vacuum Pumps (Ref. Fig. 010)
Operation of aft valve vacuum pumps is identical to that described in paragraph 6. B. (2).

(2) Forward valve vacuum pumps
(Ref. Fig. 010)

Static pressure is routed and admitted to chamber (1) of pressure switch through orifice (C) of motor casing.
When the differential pressure between chamber (1) and (2) of pressure switch is lower than 2 ± 0.3 psi (145 ± 20 m bar), the electric motor is supplied.
The centrifugal turbine creates a negative pressure inside the motor housing which is connected to the regulating and safety valve.
The air is bled inside the control chamber of regulating and safety valve ; it is sucked through orifice A in vacuum pump then discharged through orifice B and routed to the regulating and safety valve discharge nozzle
The vacuum pump stops operating when the differential pressure inside pressure switch is greater than 2 ± 0.3 psi (145 ± 20 mb).
The pressure switch also controls the electronics racks extractor fans.

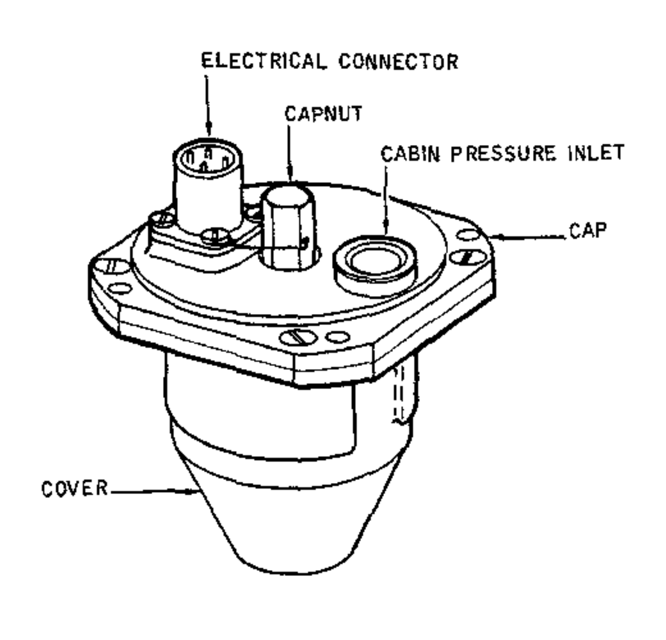
7. Switch-Altitude

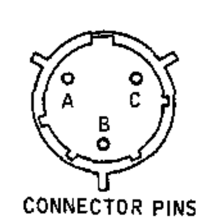
The function of the altitude switch is to trigger a warning when the cabin altitude reaches 10,000 ± 300 ft (3037 + 0 - 152 m)

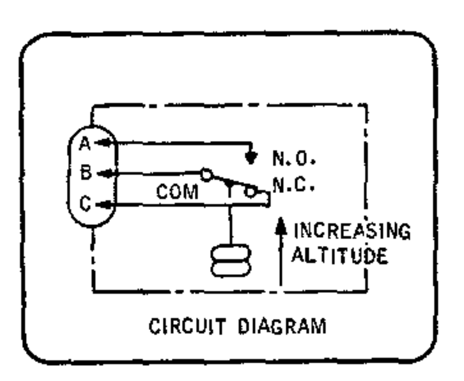
A. Description
(Ref. Fig. 011)

This switch consists of :

- A plate with an electrical connector fitted on the external face and a cabin pressure connector fitted on the internal face.
- A securing system for the parts located inside the altitude switch.
- A barometric capsule
- A microswitch
- A housing installed against the plate ; a seal is located between the housing and the plate.







CMA 21 35 00 0 AMWO

Altitude Switch
Figure 011

B. Operation

(Ref. Fig. 011)

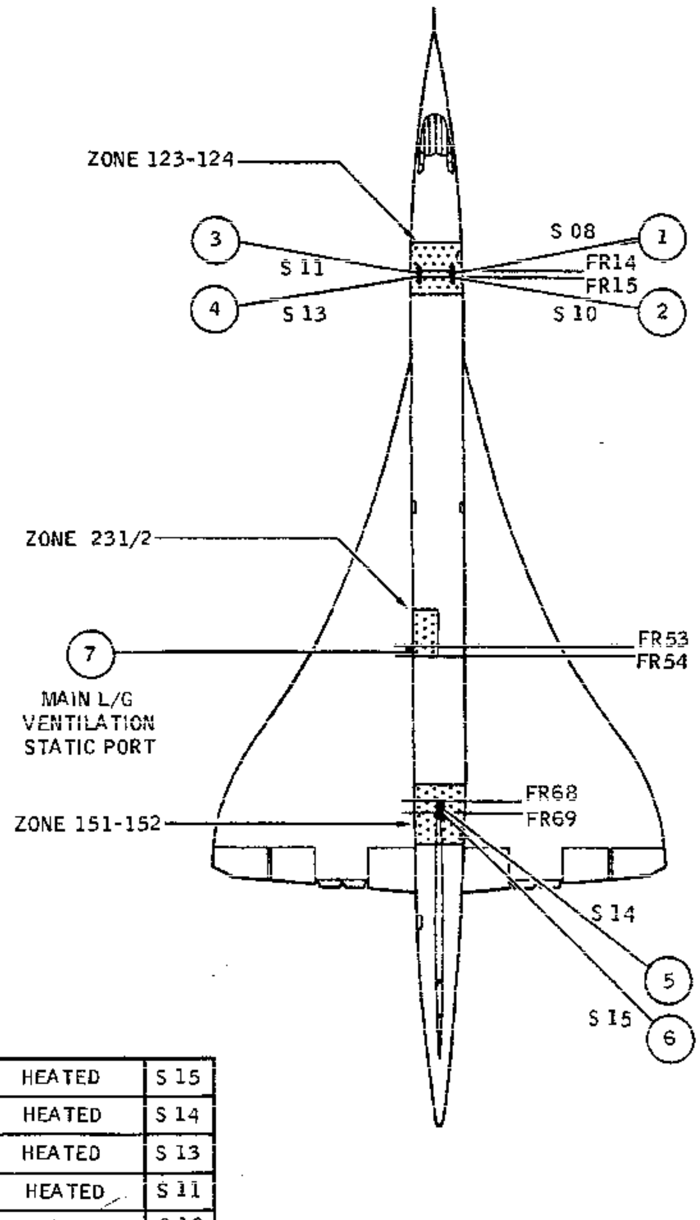
This altitude switch is located at flight engineer's station in zone 214, on HYDRAULIC MANAGEMENT panel.
The cabin pressure is admitted in the housing cabin pressure orifice
In normal conditions, the microswitch contact is open, the barometric capsule expands or contracts with respect to cabin pressure variations.
When the cabin pressure descends to a pressure/altitude of between 9500 and 10000 ft (2895 to 3047 m) the capsule expands sufficiently to close the microswitch contact and cause EXCESS ALT warning light to come on on CABIN PRESSURE CONTROL panel, and PRESS warning light to come on on master warning panel. The associated aural warnings sound

8. Ports - Static Pressure
(Ref. Fig. 012)

The outside air pressure which is required for operation of :

- The pressure regulating selectors
- The amplifiers and the pressure regulating and safety valves
is taken from the fuselage by means of 5 heated static pressure ports and a non-heated port.

A discharge valve located on each static pressure circuit allows discharge of water condensation.
Heating control is ensured from ceiling panel 4-211 at flight compartment (Ref. 30-31-00)



6	STATIC PORT L.H AFT VALVE	HEATED	S 15
5	STATIC PORT R.H AFT VALVE	HEATED	S 14
4	STATIC PORT L.H FWD VALVE	HEATED	S 13
3	STATIC PORT L.H AMPLIFIER	HEATED	S 11
2	STATIC PORT R.H FWD VALVE	HEATED	S 10
1	STATIC PORT R.H AMPLIFIER	NOT HEATED	S 08

CMA 21 35 00 0 ANMO

Static Pressure Ports
Figure 012

9. Connection - Ground Pressure

This connection allows cabin pressurization on the ground without operating the aircraft air conditioning system.
It is located under the aft fuselage between frames 68 and 69.
Two pressure ports located close to the ground connection allow pressure switches to be connected for measurement of cabin pressure during tests on the ground.

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10. Controls and Indicating

Controls and indicating are grouped on Captain's and Flight Engineer's panels

A. Captain's station

(1) On ceiling panel, master warning panel, 1 PRESS warning light which is caused to operate either by an excessive cabin pressure altitude or by an excessive cabin differential pressure (with associated aural warning)

B (2) On Captain's 1-211 or 7-211, a cabin altimeter. The al-
B titudes above 10.000 feet are identified by a red label

B. Flight Engineer's station : CABIN PRESSURE CONTROL panel

(1) Controls

- Two SYS SELECT switches
- Two pressure regulating selectors (one for each system)
- Two DISCHARGE VALVES SYS1 and SYS2 switches allow the valves to be closed
- One three position EMERGY DEPRESS - NORM - GRD TEST switch for emergency depressurization and test
- Two DITCHING SYS1 - SYS2 switches allow the valves to be closed in case of ditching
- One SHUT1 - AUTO - SHUT2 switch allows the ground pressure valve to be closed

(2) Indicating

- A cabin altimeter. The altitudes above 10,000 feet are identified by a red tape.
- A cabin differential pressure gauge
- A cabin vertical speed indicator
- A valve position indicator
- An AIR VENTS L/G magnetic indicator, for the landing gear bay ventilation valve
- A HYD magnetic indicator for hydraulic chassis ventilation valve
- A THRUST RECUPERATOR magnetic indicator (thrust recovery nozzle)
- A GROUND PRESSURE RELIEF VALVE magnetic indicator

(3) Warnings

- An O/PRESSURE warning light for cabin excessive differential pressure operated by excessive differential pressure switches of forward valves.
- An excessive cabin pressure altitude EXCESS ALT

warning light controlled by the altitude switch (Ref. 21-35-41, Adjustment/Test).
- An EXCESS ALT repetitive aural warning
- An O/PRESS repetitive aural warning

11. Cabin Pressure Control System Operation
(Ref. Fig. 013)

A. Control

(1) On Flight Engineer's CABIN PRESSURE CONTROL panel, SYS SELECT switches allow selection of the pressure control system : SYS1 or SYS2. DISCHARGE VALVES and EMERGY DEPRESS switches are in NORM position. The EMERGY DEPRESS switch guard must be lead sealed. On the pressure regulating selector associated with the selected system select :

(a) The desired cabin altitude (Knob A)

(b) The cabin pressure variation rate (Knob R)

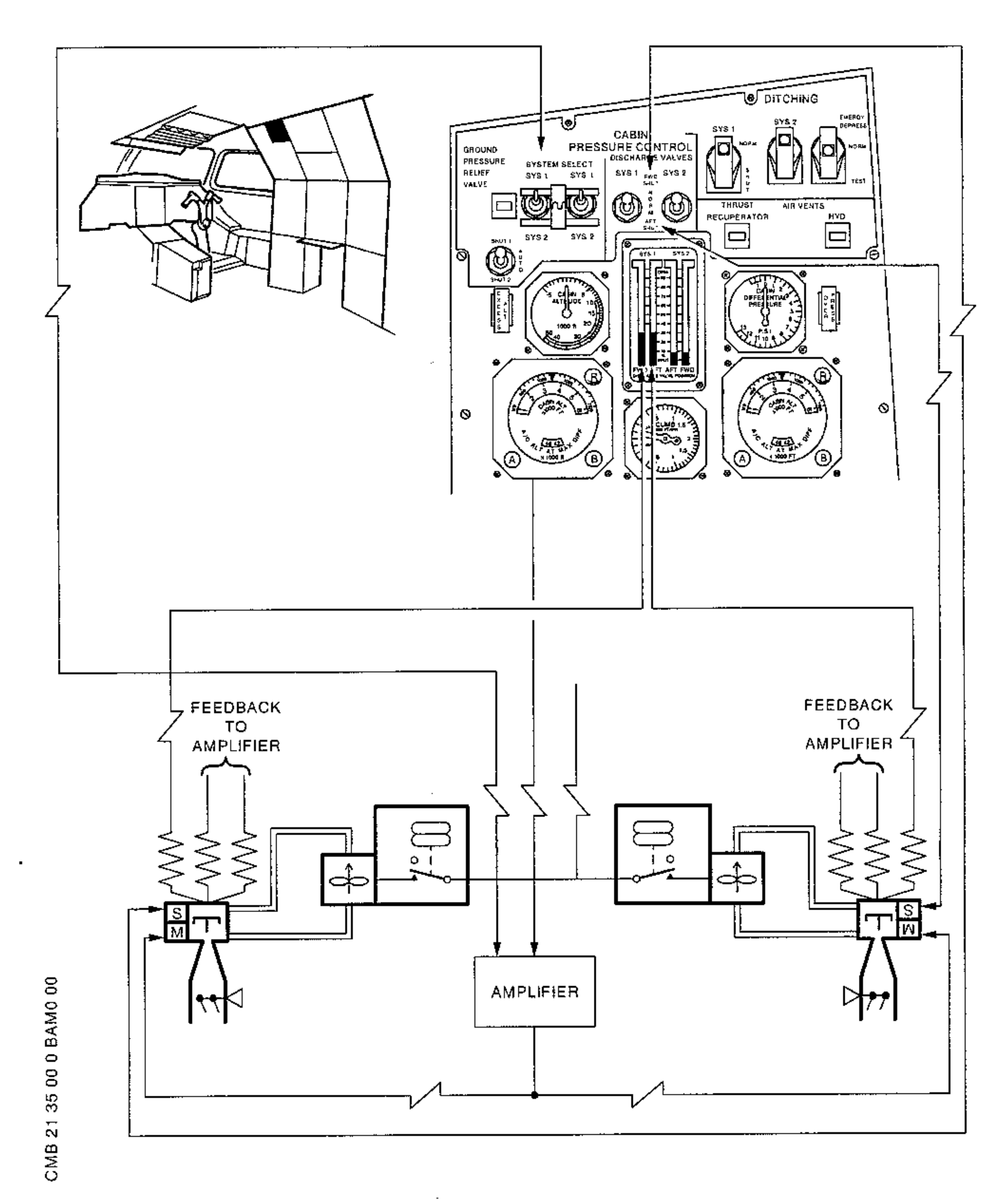
(c) The correction of barometric pressure (Knob B)

A selector window displays the aircraft flight altitude for which the cabin normal positive maximum differential pressure is reached, with respect to the selected cabin altitude.
Depending on all the parameters selected, a signal is transmitted from the regulating selector to the amplifier.
Depending on the signal from the amplifier, the torque motor causes the (controlled) opening or closure of the pressure regulating and safety valves. The valves, through the potentiometers send back two electric signals to the amplifier.

- A feedback signal at the valve displacement speed
- A comparison signal of the aft-forward valve opening in order to have a flow between forward and aft valves which is in the 4.2 : 1 ratio
- A third signal is transmitted to the DISCHARGE VALVE POSIT indicator showing the position of the valves.

On each valve, a vacuum pump allows valve operation when the cabin differential pressure is low. These vacuum pumps start operating as soon as the aircraft electrical network is energized. The forward vacuum pumps stop when the differential pressure is 2 psi. 145 m bars. The aft vacuum pumps stop when the differential pressure is equal to 1 psi. (76 m bars.)

B. Safety



CMB 21 35 00 0 BAM0 00

Cabin Pressure Control Panel
Figure 013

(1) Limitation of Cabin Accidental Maximum Pressure Altitude

(a) At a cabin altitude of 11,000 + 0 - 1,000 ft (3350 + 0 - 300 m) main landing gear bay ventilation valve closes.

(b) At a cabin altitude 10,000 + 0 - 500 ft (3048 + 0 - 152 m), the altitude switch causes :

- PRESS warning light to come on, on master warning panel
- EXCESS ALT warning light to come on, on CABIN PRESSURE CONTROL panel, at Flight Engineer's station
- The aural warning (repetitive gong and intermittent horn) to sound.

(c) At 11,000 ± 250 ft (3350 ± 75 m), the aneroid capsule (subjected to cabin pressure) of the valve altitude limiter starts operating. The valves close either partially or fully to limit the cabin maximum altitude to the adjusted value.

(d) At 15,000 ± 250 ft (4575 ± 75 m), the valve altitude limiter capsule is completely expanded. The section of port "c" is sufficient to cause the valves to close whatever the section of the other ports of the valve upper chamber.

(2) Limitation of Cabin Pressure Accidental Maximum Differential Pressure

- When the accidental maximum differential pressure reaches the value 11 ± 1 psi (759 ± 7 mbars), the contactor of the forward valve accidental maximum pressure limiter causes :

- The PRESS warning light to come on, on master warning panel
- The O/PRESS warning light to come on at Flight Engineer's station on CABIN PRESSURE CONTROL panel
- The aural warning (repetitive gong) to sound.

(3) For a positive accidental maximum cabin pressure difference of 11.2 psi (773 ± 7 mbars), the valves open.

(4) For a negative maximum differential pressure difference of 0.5 psi (35 mbars), the valves open.

(5) Ditching

When the aircraft has ditched, the DITCHING VALVES switch on CABIN PRESSURE CONTROL panel must be placed in SHUT position. The water pressure enters the upper chamber P1. This pressure, added to the return spring force causes the valve to close.

(6) Reclosing Electrovalve

The DISCHARGE VALVES SYS1 - SYS2 switches allow the aft or forward valve of each system to be closed. Only one valve can be closed at a time.

(7) Emergency Depressurization

When EMERGY DEPRESS TEST switch is placed in EMERGY DEPRESS position (after lifting the guard) the SYS2 valves open.
EMERGY DEPRESS switch actuation results in cutting off (via relay H1177) SYS2 amplifier on the RATE TRANSDUCER circuit. The cabin pressure variation rate is no longer controlled.

12. Power Supply of Cabin Pressure Control System

A. Electrical distribution

The electrical circuit of the cabin pressure control is supplied by the busbars listed below, with corresponding positions and references

	CIRCUIT BREAKER	BUS BAR	PANEL	MAP REF	SERVICE
R	G 292	3P	1-213	M17	LH U/C WEIGHT SW "A" SYS SUP
R R	G 295	3P	1-213	M18	RH U/C WEIGHT SW & DOWN-LOCK A SYS SUP
	H1101	3P	1-213	G11	CABIN EXCESS ALT WARN IND
R	H1122	6XB	2-213	H16	SYS1 PRESSN CONT & SUP
R	H1123	5XB	2-213	A16	SYS2 VAC PUMP SUP & FWD FAN AUTO CONT
R	H1124	3P	1-213	E13	SYS2 FWD & AFT DISCHARGE VALVE SUP
R	H1125	4P	5-213	E 8	SYS1 FWD & AFT DISCHARGE VALVE SUP
	H1126	4P	5-213	E 9	CABIN OVER PRESS IND
R	H1127	6XC	2-213	G17	SYS1 VAC PUMP SUP & FWD FAN AUTO CONT
	H1128	6XB	2-213	H17	SYS1 DISCH VALVE POSN IND
	H1129	5XB	2-213	A17	SYS2 DISCH VALVE POSN IND
	H1149	3P	1-213	G13	SYS1 DITCHING VALVE CONT
	H1150	3P	1-213	F10	SYS2 DITCHING VALVE CONT
R	H1157	1P	15-215	E 3	SYS1 GRND PRESSN CONT
R	H1158	2P	15-216	D23	SYS2 GRND PRESSN CONT
R	H1159	5XB	2-213	H15	SYS2 PRESSN CONT & SUP

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PRESSURE CONTROL - TROUBLE SHOOTING

WARNING : OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

1. General

The following trouble shooting procedures are intended to enable faults found in the pressure control system on the ground or in flight to be quickly rectified.

The defect can be isolated with the aid of trouble shooting procedures and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary. If a defect occurs perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure that the operation is OK.

Bracketed numbers in the procedures and charts indicate items on the component identification table (Ref Table 101). The table provides information, including component location, required for rectification.

All procedures dealing with trouble shooting are based on the assumption that electrical wiring is serviceable, all associated circuit breakers are set and electrical power is available, unless otherwise stated. If the fault is not rectified, check the wiring in accordance with the wiring diagram manual (Ref Table 101).

2. Prepare

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Multimeter	

NOTE : Trouble shooting shall be carried out with aircraft in ground configuration, shock absorbers compressed.

B.

(1) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW "A" SYS SUP	1-213	G292	M17
RH UC WEIGHT SW "A" SYS SUP		G295	M18
CABIN EXCESS ALT WARN IND		H1101	G11
SYS 2 FWD AFT DISCHARGE VALVE SUP		H1124	E13
SYS 1 DITCHING VALVE CONT		H1149	G13
SYS 2 DITCHING VALVE CONT		H1150	F10
SYS 1 PRESSN CONT SUP	2-213	H1122	H16
SYS 2 VAC PUMP SUP FWD FAN AUTO CONT		H1123	A16
SYS 1 VAC PUMP SUP FWD FAN AUTO CONT		H1127	G17
SYS 1 DISCH VALVE POSN IND		H1128	H17
SYS 2 DISCH VALVE POSN IND		H1129	A17
SYS 2 PRESSN CONT SUP		H1159	H15
SY 1 FWD AFT DISCHARGE VALVE SUP	5-213	H1125	E 8
CABIN OVER PRESS IND		H1126	E 9
SYS 1 GRD PRESSN CONT	15-215	H1157	E 3
SYS 2 GRD PRESSN CONT	15-216	H1158	D23

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing.

(3) On Flight Engineer's CABIN PRESSURE CONTROL panel 1-214 check indication and corresponding alarms.

R (a) Push EXCESS ALT warning light/switch module
R [2] then release. While warning light/switch
R module is depressed both EXCESS ALT warning light and PRESS warning light on master warning panel must be illuminated, and aural warning must sound.

(b) Push OVER PRESS caption light/switch module [16], then release. While caption light/switch module
R is depressed both OVER PRESS warning light and PRESS warning light on master warning panel must

be illuminated, and aural warning must sound.

(c) On DISCHARGE VALVE POSIT position indicator [27] make certain that flags are not displayed.

(4) In flight compartment, on centre console, make certain that the four throttle control levers are in idle position.

3. Trouble Shooting

```
   *****************************************************
   * With aircraft on ground, the four throttle control *
   * levers in idle position and EMERG DEPRESS/NORM/    *
   * TEST switch [13] in NORM position, OVER PRESS      *
R  * warning light [16] is not illuminated.             *
   *****************************************************
        ||   |
        ||   |              ------------------------------------------------
R       ||   |             | OVER PRESS warning light [16] and PRESS warning|
        YES  |-NO------| light on master warning panel illuminated ;   |
        ||                 | associated aural warnings sound.               |
        ||                 | Ref. Chart 101.                                |
        ||                  ------------------------------------------------
        ||
   *****************************************************
R  * EXCESS ALT warning light [2] is not illuminated.   *
   *****************************************************
        ||   |
        ||   |              ------------------------------------------------
R       ||   |             | EXCESS ALT warning light [2] and PRESS warning |
        YES  |-NO------| light on master warning panel illuminated ;   |
        ||                 | associated aural warnings sound.               |
        ||                 | Ref. Chart 102.                                |
        ||                  ------------------------------------------------
        ||
```

```
*****************************************************
* System 1 or 2 is selected. SYS 1 FWD and AFT tapes *
* on position indicator [27] are in OPEN position.   *
*****************************************************
    ||   |
    ||   |
    ||   |         ------------------------------------------------
    ||   |         | SYSTEM SELECT switches in SYS 1 or SYS 2      |
    ||   |         | position. Position indicator [27] displays :  |
    ||   |-NO------| - SYS 1 FWD - SHUT, SYS 1 AFT - OPEN          |
    ||   |         | - SYS 2 FWD - OPEN, SYS 2 AFT - OPEN          |
    ||   |         | Ref. Chart 103.                               |
    ||   |         ------------------------------------------------
    ||   |
    ||   |
    ||   |         ------------------------------------------------
    ||   |         | SYSTEM SELECT switches in SYS 1 or SYS 2      |
    ||   |         | position. Position indicator [27] displays :  |
    ||   |-NO------| - SYS 1 FWD - OPEN, SYS 1 AFT - SHUT          |
    ||   |         | - SYS 2 FWD - OPEN, SYS 2 AFT - OPEN          |
    ||   |         | Ref. Chart 104.                               |
    ||   |         ------------------------------------------------
    ||   |
    ||   |
    ||   |         ------------------------------------------------
    ||   |         | SYSTEM SELECT switches in SYS 2 position.     |
    ||   |         | Position indicator [27] displays :            |
    YES  |-NO------| - SYS 1 FWD - SHUT, SYS 1 AFT - SHUT          |
    ||   |         | - SYS 2 FWD - OPEN, SYS 2 AFT - OPEN.         |
    ||   |         | Ref. Chart 105.                               |
    ||   |         ------------------------------------------------
    ||   |
    ||   |
    ||   |         ------------------------------------------------
    ||   |         | SYSTEM SELECT switches in SYS 1 position.     |
    ||   |         | Position indicator [27] displays :            |
    ||   |-NO------| - SYS 1 FWD - SHUT, SYS 1 AFT - SHUT          |
    ||             | - SYS 2 FWD - OPEN, SYS 2 AFT - OPEN          |
    ||             | Ref. Chart 106.                               |
    ||             ------------------------------------------------
    ||
    ||
```

```
****************************************************
* System 1 or 2 is selected. SYS 2 FWD and AFT tapes *
* are in OPEN position.                              *
****************************************************
     ||   |
     ||   |
     ||   |          ------------------------------------------------
     ||   |          | SYSTEM SELECT switches in SYS 1 or SYS 2     |
     ||   |          | position. Position indicator [27] displays : |
    YES   |-NO-------| - SYS 1 FWD - OPEN, SYS 1 AFT - OPEN         |
     ||   |          | - SYS 2 FWD - SHUT, SYS 2 AFT - OPEN         |
     ||   |          | Ref. Chart 103.                              |
     ||   |          ------------------------------------------------
     ||   |
     ||   |          ------------------------------------------------
     ||   |          | SYSTEM SELECT switches in SYS 1 or SYS 2     |
     ||   |          | position. Position indicator [27] displays : |
     ||   |-NO-------| - SYS 1 FWD - OPEN, SYS 1 AFT - OPEN         |
     ||   |          | - SYS 2 FWD - OPEN, SYS 2 AFT - SHUT         |
     ||   |          | Ref. Chart 104.                              |
     ||   |          ------------------------------------------------
     ||   |
     ||   |          ------------------------------------------------
     ||   |          | SYSTEM SELECT switches in SYS 2 position.    |
     ||   |          | Position indicator [27] displays :           |
     ||   |-NO-------| - SYS 1 FWD - OPEN, SYS 1 AFT - OPEN         |
     ||   |          | - SYS 2 FWD - SHUT, SYS 2 AFT - SHUT         |
     ||   |          | Ref. Chart 107.                              |
     ||   |          ------------------------------------------------
     ||   |
     ||   |          ------------------------------------------------
     ||   |          | SYSTEM SELECT switches in SYS 1 position.    |
     ||   |-NO-------| Position indicator [27] displays :           |
     ||              | - SYS 1 FWD - OPEN, SYS 1 AFT - OPEN         |
     ||              | - SYS 2 FWD - SHUT, SYS 2 AFT - SHUT         |
     ||              | Ref. Chart 108.                              |
     ||              ------------------------------------------------
     ||
     ||
```

```
*******************************************************
* DISCHARGE VALVES SYS 1 switch [14] is placed in     *
* FWD SHUT then AFT SHUT position. Respective tapes   *
* move to SHUT position.                              *
*******************************************************
     ||   |
     ||   |
     ||   |      ---------------------------------------------------
     ||   |      | Switch [14] in FWD SHUT then AFT SHUT position  |
     ||   |      | Position indicator [27] displays :              |
     YES  |-NO---| - SYS 1 FWD - OPEN, SYS 1 AFT - OPEN            |
     ||   |      | - SYS 2 FWD - OPEN, SYS 2 AFT - OPEN            |
     ||   |      | Ref. Chart 109.                                 |
     ||   |      ---------------------------------------------------
     ||   |
     ||   |      ---------------------------------------------------
     ||   |      | Switch [14] in FWD SHUT then AFT SHUT position  |
     ||   |      | Position indicator [27] displays :              |
     ||   |-NO---| - SYS 1 FWD - OPEN,                             |
     ||   |      | then :                                          |
     ||   |      | - SYS 1 AFT - SHUT,                             |
     ||   |      | and in both positions :                         |
     ||   |      | - SYS 2 FWD - OPEN, SYS 2 AFT - OPEN            |
     ||   |      | Ref. Chart 110.                                 |
     ||   |      ---------------------------------------------------
     ||   |
     ||   |      ---------------------------------------------------
     ||   |      | Switch [14] in FWD SHUT then AFT SHUT position  |
     ||   |      | Position indicator [27] displays :              |
     ||   |      | - SY 1 FWD - SHUT,                              |
     ||   |-NO---| then :                                          |
     ||          | - SYS 1 AFT - OPEN,                             |
     ||          | and in both positions :                         |
     ||          | - SYS 2 FWD - OPEN, SYS 2 AFT OPEN              |
     ||          | Ref. Chart 111.                                 |
     ||          ---------------------------------------------------
     ||
     ||
```

```
*****************************************************
* DISCHARGE VALVES SYS 2 switch [15] is placed in   *
* FWD SHUT then AFT SHUT position. Respective tapes *
* move to SHUT position.                            *
*****************************************************
   || |
   || |         ------------------------------------------------
   || |        | Switch [15] in FWD SHUT then AFT SHUT position |
   || |        | Position indicator [27] displays :             |
   YES|-NO-----| - SYS 1 FWD - OPEN, SYS 1 AFT - OPEN           |
   || |        | - SYS 2 FWD - OPEN, SYS 2 AFT - OPEN           |
   || |        | Ref. Chart 109.                                |
   || |         ------------------------------------------------
   || |
   || |         ------------------------------------------------
   || |        | Switch [15] in FWD SHUT then AFT SHUT position |
   || |        | Position indicator [27] displays :             |
   || |        | - SYS 2 FWD - OPEN,                            |
   || |-NO-----| then :                                         |
   || |        | - SYS 2 AFT - SHUT,                            |
   || |        | and in both positions :                        |
   || |        | - SYS 1 FWD - OPEN, SYS 1 AFT - OPEN           |
   || |        | Ref. Chart 110.                                |
   || |         ------------------------------------------------
   || |
   || |         ------------------------------------------------
   || |        | Switch [15] in FWD SHUT then AFT SHUT position |
   || |        | Position indicator [27] displays :             |
   || |        | - SYS 2 FWD - SHUT,                            |
   || |-NO-----| then :                                         |
   ||          | - SYS 2 AFT - OPEN,                            |
   ||          | and in both positions :                        |
   ||          | - SYS 1 FWD - OPEN, SYS 1 AFT - OPEN           |
   ||          | Ref. Chart 111.                                |
   ||           ------------------------------------------------
   ||
   ||
```

```
*****************************************************
* System 1 is selected. When one throttle control   *
* lever is placed in maximum thrust position, two   *
* SYS 1 tapes move to SHUT position.                *
*****************************************************
      ||   |
      ||   |
      ||   |     ------------------------------------------------
      ||   |    | SYSTEM SELECT switches in SYS 1 position       |
      ||   |    | Throttle control lever(s) in maximum thrust    |
      ||   |    | position. Position indicator [27] displays :   |
      YES  |-NO-| - SYS 1 FWD - OPEN, SYS 1 AFT - OPEN           |
      ||   |    | - SYS 2 FWD - SHUT, SYS 2 AFT - SHUT           |
      ||   |    | GROUND PRESSURE RELIEF VALVE magnetic indicator|
      ||   |    | displays SHUT.                                 |
      ||   |    | Ref. Chart 112.                                |
      ||   |     ------------------------------------------------
      ||   |
      ||   |     ------------------------------------------------
      ||   |    | SYSTEM SELECT switches in SYS 1 position       |
      ||   |    | Throttle control lever(s) in maximum thrust    |
      ||   |    | position. Position indicator [27] displays :   |
      ||   |    | - SYS 1 FWD - SHUT                             |
      ||   |-NO-| - SYS 1 AFT - OPEN or 50 %                    |
      ||        | - SYS 2 FWD - SHUT, SYS 2 AFT - SHUT           |
      ||        | GROUND PRESSURE RELIEF VALVE magnetic indicator|
      ||        | displays SHUT.                                 |
      ||        | Ref. Chart 116.                                |
      ||         ------------------------------------------------
      ||
      ||
```

```
****************************************************
* System 1 is selected. When one throttle control   *
* lever is placed in maximum thrust position, two   *
* SYS 2 tapes move to SHUT position.                *
****************************************************
```

YES

-NO-

SYSTEM SELECT switches in SYS 1 position
Throttle control lever(s) in maximum thrust position. Position indicator [27] displays :
- SYS 1 FWD - SHUT, SYS 1 AFT - SHUT
- SYS 2 FWD - OPEN, SYS 2 AFT - OPEN
GROUND PRESSURE RELIEF VALVE magnetic indicator displays SHUT.
Ref. Chart 113.

-NO-

SYSTEM SELECT switches in SYS 1 position
Throttle control lever(s) in maximum thrust position. Position indicator [27] displays :
- SYS 1 FWD - SHUT, SYS 1 AFT - SHUT
- SYS 2 FWD - SHUT
- SYS 2 AFT - OPEN or 50 %
GROUND PRESSURE RELIEF VALVE magnetic indicator displays SHUT.
Ref. Chart 117.

```
****************************************************
* System 2 is selected. When one throttle control  *
* lever is placed in maximum thrust position, two  *
* SYS 2 tapes move to SHUT position.               *
****************************************************
    ||  |
    ||  |
    ||  |     --------------------------------------------------
    ||  |     | SYSTEM SELECT switches in SYS 2 position        |
    ||  |     | Throttle control lever(s) in maximum thrust     |
    ||  |     | position. Position indicator [27] displays :    |
   YES  |-NO--| - SYS 1 FWD - SHUT, SYS 1 AFT - SHUT            |
    ||  |     | - SYS 2 FWD - OPEN, SYS 2 AFT - OPEN            |
    ||  |     | GROUND PRESSURE RELIEF VALVE magnetic indicator |
    ||  |     | displays SHUT.                                  |
    ||  |     | Ref. Chart 114.                                 |
    ||  |     --------------------------------------------------
    ||  |
    ||  |     --------------------------------------------------
    ||  |     | SYSTEM SELECT switches in SYS 2 position        |
    ||  |     | Throttle control lever(s) in maximum thrust     |
    ||  |     | position. Position indicator [27] displays :    |
    ||  |     | - SYS 1 FWD - SHUT, SYS 1 AFT - SHUT            |
    ||  |-NO--| - SYS 2 FWD - SHUT                              |
    ||        | - SYS 2 AFT - OPEN or 50 %                      |
    ||        | GROUND PRESSURE RELIEF VALVE magnetic indicator |
    ||        | displays SHUT.                                  |
    ||        | Ref. Chart 117.                                 |
    ||        --------------------------------------------------
    ||
```

```
*******************************************************
* System 2 is selected. When one throttle control    *
* lever is placed in maximum thrust position, two    *
* SYS 1 tapes move to SHUT position.                 *
*******************************************************
    ||  |
    ||  |
    ||  |    --------------------------------------------------
    ||  |    | SYSTEM SELECT switches in SYS 2 position         |
    ||  |    | Throttle control lever(s) in maximum thrust      |
    ||  |    | position. Position indicator [27] displays :     |
    YES |-NO-| - SYS 1 FWD - OPEN, SYS 1 AFT - OPEN             |
    ||  |    | - SYS 2 FWD - SHUT, SYS 2 AFT - SHUT             |
    ||  |    | GROUND PRESSURE RELIEF VALVE magnetic indicator  |
    ||  |    | displays SHUT.                                   |
    ||  |    | Ref. Chart 115.                                  |
    ||  |    --------------------------------------------------
    ||  |
    ||  |    --------------------------------------------------
    ||  |    | SYSTEM SELECT switches in SYS 2 position         |
    ||  |    | Throttle control lever(s) in maximum thrust      |
    ||  |    | position. Position indicator [27] displays :     |
    ||  |    | - SYS 1 FWD - SHUT                               |
    ||  |-NO-| - SYS 1 AFT - OPEN or 50 %                       |
    ||       | - SYS 2 FWD - SHUT, SYS 2 AFT - SHUT             |
    ||       | GROUND PRESSURE RELIEF VALVE magnetic indicator  |
    ||       | displays SHUT.                                   |
    ||       | Ref. Chart 116.                                  |
    ||       --------------------------------------------------
    ||
*******************************************************
* End of ground tests.                               *
* De-energize the aircraft electrical network and    *
* disconnect electrical ground power unit            *
* (Ref. 24-41-00, Servicing).                        *
* Proceed to in-flight tests.                        *
*******************************************************
```

```
****************************************************
* Aircraft is in flight. With system 1 selected, two *
* SYS 1 valves [17, 18] regulate correctly.         *
****************************************************
```

YES

-NO------ SYSTEM SELECT switches in SYS 1 position.
Position indicator [27] displays :
- SYS 1 FWD - OPEN, SYS 1 AFT - OPEN
- SYS 2 FWD - SHUT, SYS 2 AFT - SHUT
CLIMB indicator [42] indicates UP
Cabin altimeter [41] indicates high altitude.
CABIN DIFFERENTIAL PRESSURE indicator [44] indicates low ΔP.
GROUND PRESSURE RELIEF VALVE magnetic indicator displays SHUT.
EXCESS ALT warning light [2] and PRESS warning light on master warning panel illuminated ; associated aural warnings sound.
Ref. Chart 118.

-NO------ SYSTEM SELECT switches in SYS 1 position.
Position indicator [27] displays :
- SYS 1 FWD - SHUT, SYS 1 AFT - SHUT
- SYS 2 FWD - SHUT, SYS 2 AFT - SHUT
CLIMB indicator [42] indicates DOWN.
Cabin altimeter [41] indicates low altitude
CABIN DIFFERENTIAL PRESSURE indicator [44] indicates high ΔP.
GROUND PRESSURE RELIEF VALVE magnetic indicator displays SHUT.
OVER PRESS warning light [16] and PRESS warning light on master warning panel illuminated ; associated aural warnings sound.
Ref. Chart 119.

```
****************************************************
* Aircraft is in flight. With system 2 selected, two *
* SYS 2 tapes on position indicator [27] indicate    *
* correct regulation.                                *
****************************************************
     ||   |
     ||   |
     ||   |         ------------------------------------------------
     ||   |         | SYSTEM SELECT switches in SYS 2 position.     |
     ||   |         | Position indicator [27] displays :            |
     ||   |         | - SYS 1 FWD - SHUT, SYS 1 AFT - SHUT          |
     ||   |         | - SYS 2 FWD - OPEN, SYS 2 AFT - OPEN          |
     ||   |         | CLIMB indicator [42] indicates UP.            |
     ||   |         | Cabin altimeter [41] indicates high           |
     ||   |         | altitude.                                     |
     YES  |-NO------| CABIN DIFFERENTIAL PRESSURE indicator [44]    |
     ||   |         | indicates low ΔP.                             |
     ||   |         | GROUND PRESSURE RELIEF VALVE magnetic indicator|
     ||   |         | displays SHUT.                                |
     ||   |         | EXCESS ALT warning light [2] and PRESS warning |
     ||   |         | light on master warning panel illuminated ;   |
     ||   |         | associated aural warnings sound.              |
     ||   |         | Ref. Chart 118.                               |
     ||   |         ------------------------------------------------
     ||   |
     ||   |
     ||   |         ------------------------------------------------
     ||   |         | SYSTEM SELECT switches in SYS 2 position.     |
     ||   |         | Position indicator [27] displays :            |
     ||   |         | - SYS 1 FWD - SHUT, SYS 1 AFT - SHUT          |
     ||   |         | - SYS 2 FWD - SHUT, SYS 2 AFT - SHUT          |
     ||   |         | CLIMB indicator [42] indicates DOWN           |
     ||   |         | Cabin altimeter [41] indicates low altitude   |
     ||   |-NO------| CABIN DIFFERENTIAL PRESSURE indicator [44]    |
     ||             | indicates high ΔP.                            |
     ||             | GROUND PRESSURE RELIEF VALVE magnetic indicator|
     ||             | displays SHUT.                                |
     ||             | OVER PRESS warning light [16] and PRESS warning|
     ||             | light on master warning panel illuminated ;   |
     ||             | associated aural warnings sound.              |
     ||             | Ref. Chart 119.                               |
     ||             ------------------------------------------------
     ||
     ||
```

```
*****************************************************
* Aircraft is in flight with system 1 selected. When *
* EMERG DEPRESS/NORM/TEST switch [13] is placed in   *
* EMERG DEPRESS position, two SYS 2 tapes move to    *
* OPEN position.                                     *
*****************************************************
      ||    |
      ||    |   -------------------------------------------------
      ||    |  | SYSTEM SELECT switches in SYS 1 position.       |
      ||    |  | Switch [13] in EMERG DEPRESS position.          |
      ||    |  | Position indicator [27] displays :              |
     YES    |-NO------| - SYS 1 FWD - regulating, SYS 1 AFT -regulating|
      ||    |  | - SYS 2 FWD - SHUT, SYS 2 AFT - SHUT            |
      ||    |  | GROUND PRESSURE RELIEF VALVE magnetic indicator |
      ||    |  | displays SHUT.                                  |
      ||    |  | Ref. Chart 120.                                 |
      ||    |   -------------------------------------------------
      ||    |
      ||    |   -------------------------------------------------
      ||    |  | SYSTEM SELECT switches in SYS 1 position.       |
      ||    |  | Switch [13] in EMERG DEPRESS position.          |
      ||    |  | Position indicator [27] displays :              |
      ||    |  | - SYS 1 FWD - regulating, SYS 1 AFT -regulating |
      ||    |-NO------| - SYS 2 FWD - partly open.               |
      ||       | - SYS 2 AFT - partly open.                      |
      ||       | CLIMB indicator [42] indicates approximately    |
      ||       | 800 ft/min.                                     |
      ||       | Ref. Chart 121.                                 |
      ||        -------------------------------------------------
      ||
*****************************************************
* Aircraft is in flight. When cabin altitude is      *
* normal and ΔP is normal (less than 759 mb), OVER   *
* PRESS warning light [16] is not illuminated.       *
*****************************************************
      ||    |
      ||    |   -------------------------------------------------
      ||    |  | Cabin altimeter [41] indicates normal           |
      ||    |  | altitude.                                       |
      ||    |  | CABIN DIFFERENTIAL PRESSURE indicator [44]      |
     YES    |-NO------| indicates ΔP less than 759 mb.           |
      ||       | OVER PRESS warning light [16] and PRESS warning |
      ||       | light on master warning panel illuminated ;     |
      ||       | associated aural warnings sound.                |
      ||       | Ref. Chart 122.                                 |
      ||        -------------------------------------------------
      ||
```

```
*****************************************************
* Aircraft is in flight. When cabin altitude is low  *
* and ΔP is high (more than 759 mb), OVER PRESS      *
* warning light [16] and PRESS warning light on      *
* master warning panel are illuminated ; associated  *
* aural warnings sound.                              *
*****************************************************
     ||   |
     ||   |       | CABIN DIFFERENTIAL PRESSURE indicator [44]   |
     ||   |       | indicates ΔP more than 759 mb.               |
     ||   |       | Cabin altitude low.                          |
    YES   |-NO----| OVER PRESS warning light [16] and PRESS WARNing|
     ||   |       | light not illuminated ; aural warnings do not |
     ||   |       | sound.                                        |
     ||   |       | Ref. Chart 123.                               |
     ||   |
*****************************************************
* Aircraft is in flight. When cabin altitude is      *
* normal, i.e. less than 10,000 ft (3, 048 m). EXCESS*
* ALT warning light [2] is not illuminated.          *
*****************************************************
     ||   |
     ||   |       | Cabin altimeter [41] indicates altitude less |
     ||   |       | than 10,000 ft.                              |
    YES   |-NO----| EXCESS ALT warning light [2] and PRESS warning|
     ||   |       | light illuminated ; associated aural warnings |
     ||   |       | sound.                                        |
     ||   |       | Ref. Chart 124.                               |
     ||   |
*****************************************************
* Aircraft is in flight. When cabin altitude is      *
* abnormal, i.e. more than 10,000 ft (3,048 m),      *
* EXCESS ALT warning light [2] and PRESS warning     *
* light are illuminated ; associated aural warnings  *
* sound.                                             *
*****************************************************
     ||   |
     ||   |       | Cabin altimeter [41] indicates altitude less |
     ||   |       | than 10,000 ft.                              |
    YES   |-NO----| EXCESS ALT warning light [2] and PRESS warning|
     ||           | light not illuminated ; aural warnings do not |
     ||           | sound.                                        |
     ||           | Ref. Chart 125.                               |
     ||
     ||
```

```
*****************************************************
* Cabin altimeter [41] and emergency altimeter [43] *
* indicate the same value.                          *
*****************************************************
    ||  |         ---------------------------------------------
    ||  |        | Cabin altimeter [41] and emergency altimeter |
    YES |-NO-----| [43] indicate different values.              |
    ||           | Ref. Chart 126.                              |
    ||            ---------------------------------------------
*****************************************************
* As soon as aircraft electrical network is         *
* energized, the flags on position indicator [27]   *
* disappear.                                        *
*****************************************************
    ||  |         ---------------------------------------------
    ||  |        | Aircraft electrical network is energized. Flags|
    YES |-NO-----| are displayed on position indicator [27].      |
    ||           | Ref. Chart 127.                                |
    ||            ---------------------------------------------
*****************************************************
* CLIMB indicator [42] indicates correctly.         *
*****************************************************
    ||  |         ---------------------------------------------
    ||  |        | Cabin altimeter [41] indicates stable altitude.|
    YES |-NO-----| Passengers and crew experience no discomfort.  |
    ||           | CLIMB indicator [42] not in zero position.     |
    ||           | Ref. Chart 128.                                |
    ||            ---------------------------------------------
*****************************************************
* CABIN DIFFERENTIAL PRESSURE indicator [44]        *
* indicates correctly.                              *
*****************************************************
    ||  |         ---------------------------------------------
    ||  |        | Cabin altimeter [41] indicates stable altitude.|
    YES |-NO-----| CABIN DIFFERENTIAL PRESSURE indicator [44]     |
    ||           | functions abnormally.                          |
    ||           | Ref. Chart 129.                                |
    ||            ---------------------------------------------
    ||
*****************************************************
* Pressure control system is operational.           *
*****************************************************
```

```
****************************************
* OVER PRESS WARNING LIGHT [16] AND    *
* PRESS WARNING LIGHT ON MASTER        *
* WARNING PANEL ILLUMINATED ;          *
* ASSOCIATED AURAL WARNINGS SOUND.     *
****************************************

****************************************
* Disconnect connector H1137A from     *
* valve [17] : OVER PRESS warning      *
* light and PRESS warning light still *
* illuminated ; associated aural       *
* warnings continue to sound.          *
****************************************
    ||                  |
    ||                  |
    ||                  |
    ||                  |
    ||                  |               ----------------------------
    YES                 |------NO-------| Replace valve [17].      |
    ||                                  ----------------------------
    ||
    ||
    ||
    ||
****************************************
* Disconnect connector H1139A from     *
* valve [19] : OVER PRESS warning      *
* light and PRESS warning light still *
* illuminated ; associated aural       *
* warnings continue to sound.          *
****************************************
    ||                  |
    ||                  |
    ||                  |
    ||                  |               ----------------------------
    YES                 |------NO-------| Replace valve [19].      |
    ||                                  ----------------------------
    ||
    ||
    ||                                  ----------------------------
    ||----------------------------------| Replace warning light [16]|
                                        ----------------------------
```

Chart 101

```
**************************************
* EXCESS ALT WARNING LIGHT [2] AND   *
* PRESS WARNING LIGHT ON MASTER      *
* WARNING PANEL ILLUMINATED ;        *
* ASSOCIATED AURAL WARNINGS SOUND.   *
**************************************

**************************************
* Disconnect connector H1103A from   *
* switch [3] : EXCESS ALT warning    *
* light and PRESS warning light still *
* illuminated ; associated aural     *
* warnings continue to sound.        *
**************************************
    ||                  |
    ||                  |
    ||                  |                -----------------------------
   YES                  |------NO-------| Replace switch [3].         |
    ||                                   -----------------------------
    ||
    ||
    ||                                   -----------------------------
    ||----------------------------------| Replace warning light [2]   |
                                         -----------------------------
```

Chart 102

```
****************************************
* SYSTEM SELECT SWITCHES IN SYS 1 OR   *
* SYS 2 POSITION. POSITION INDICATOR   *
* [27] DISPLAYS :                      *
* - SYS 1 FWD - SHUT, SYS 1 AFT - OPEN*
* - SYS 2 FWD - OPEN, SYS 2 AFT - OPEN*
****************************************
*****************************************************
* At valve [17] listen to sound of vacuum pump [21]  *
* rotating. Vacuum pump rotates.                    *
*****************************************************
    ||   |
    ||   |
    ||   |                           -----------------------------
   YES   |--NO-----------------------| Replace vacuum pump [21]  |
    ||                               -----------------------------
    ||
    ||                               -----------------------------
    ||-------------------------------| Replace valve [17]        |
                                     -----------------------------
```

CORRESPONDENCE WITH SYSTEM 2.	
VALVE - FWD	H1139 [19]
PUMP - FWD	H1143 [23]
POSITION INDICATOR [27] displays : - SYS 1 FWD - OPEN, SYS 2 AFT - OPEN - SYS 2 FWD - SHUT, SYS 2 AFT - OPEN	

Chart 103

```
****************************************
* SYSTEM SELECT SWITCHES IN SYS 1 OR   *
* SYS 2 POSITION. POSITION INDICATOR   *
* [27] DISPLAYS.                       *
* - SYS 1 FWD - OPEN, SYS 1 AFT - SHUT*
* - SYS 2 FWD - OPEN, SYS 2 AFT - OPEN*
****************************************
*****************************************************
* At valve [18] listen to sound of vacuum pump [22]  *
* rotating. Vacuum pump rotates.                     *
*****************************************************
    ||  |
    ||  |                            ------------------------------
   YES  |--NO------------------------| Replace vacuum pump [2].   |
    ||                               ------------------------------
    ||
    ||                               ------------------------------
    ||-------------------------------| Replace valve [18].        |
                                     ------------------------------
```

CORRESPONDENCE WITH SYSTEM 2.	
VALVE - AFT	H1140 [20]
VACUUM PUMP - AFT	H1144 [24]
POSITION INDICATOR [27] displays : SYS 1 FWD - OPEN, SYS 1 AFT - OPEN SYS 2 FWD - OPEN, SYS 2 AFT - SHUT	

Chart 104

```
**************************************-------------------------------
* SYSTEM SELECT SWITCHES IN SYS 2     *| GROUND EQUIPMENT REQUIRED   |
* POSITION. POSITION INDICATOR [27]   *-------------------------------
* DISPLAYS :                          *| DESCRIPTION        PART NO. |
* - SYS 1 FWD - SHUT, SYS 1 AFT -SHUT*-------------------------------
* - SYS 2 FWD - OPEN, SYS 2 AFT -OPEN*| MULTIMETER                  |
**************************************-------------------------------
*****************************************************
* Place SYSTEM SELECT switches in SYS 2 position    *
* SYS 1 FWD and AFT tapes remain in SHUT position.  *
*****************************************************
    ||  |        ***************************************************
    ||  |        * Open access door 123AB. In relay box 2-123, on *
   YES  |-NO------* test connector UT1837, measure voltage between *
    ||           * pins 3A and 3D.                                *
    ||           ***************************************************
    ||              ||  |   ------------------------------------
    ||           28 V   |0 V| Ref. 32-61-00, Trouble Shooting.  |
    ||              ||      ------------------------------------
    ||              ||      ------------------------------------
    ||              ||------| Replace relay [45]               |
    ||                      | Ref. 32-00-00, Removal/Installation. |
    ||                      ------------------------------------
*****************************************************
* At valves [17, 18] listen to sound of vacuum pumps *
* rotating. Vacuum pumps rotate.                    *
*****************************************************
    ||  |                   ------------------------------------
   YES  |-NO----------------| Replace circuit breaker [9].     |
    ||                      ------------------------------------
*****************************************************
* On front of amplifier pack [26] measure voltage   *
* between pins U and R.                             *
*****************************************************
    ||  |                   ------------------------------------
  115 V |-0 V---------------| Replace circuit breaker [4]      |
    ||                      ------------------------------------
*****************************************************
* Switch [13] in NORM position. Remove amplifier    *
* pack [26]. Measure voltage between terminal 9 on  *
* connector H1146A and chassis.                     *
*****************************************************
    ||  |
    ||  |
    ||  |
  28 V  0 V
    ||  |
    ||  |
```

Chart 105 (Sheet 1 of 3)

```
    ||   |
    ||   |    ***************************************************
    ||   |----* On switch [13] measure voltage between terminal 1   *
    ||        * and aircraft ground.                                *
    ||        ***************************************************
    ||          ||   |    *****************************************
    ||        28 V   |0 V* On switch [13] measure voltage between    *
    ||          ||         * terminal 2 and aircraft ground.          *
    ||          ||         *****************************************
    ||   *********************************       ||            |
    ||   * Open access door 123AB. In relay *    ||            |
    ||   * box 2-123, on test connector     *   28 V          0 V
    ||   * UT1837 measure voltage between   *    ||            |
    ||   * terminals 3A and 3B.             *    ||            |
    ||   *********************************       ||            |
    ||        ||    |    -------------------------------       |
    ||        ||    |    | Replace switch [13].          |     |
    ||        ||    |    -------------------------------       |
    ||       28 V 0 V    ------------------------------------------
    ||        ||    |    | Replace circuit breaker [34].          |
    ||        ||    |    ------------------------------------------
    ||        ||    |    ------------------------------------------
    ||        ||    |----| Ref. 32-61-00, Trouble Shooting.       |
    ||        ||         ------------------------------------------
    ||   *********************************
    ||   * In relay box 3-123, on test      *
    ||   * connector UT1838 measure voltage *
    ||   * between terminals 13A and 13D.   *
    ||   *********************************
    ||        ||    |    ------------------------------------------
    ||       28 V 0 V--| Replace relays [48] and [50].          |
    ||        ||         ------------------------------------------
    ||        ||         ------------------------------------------
    ||        ||--------| Ref. 32-61-00, Trouble Shooting.       |
    ||                   ------------------------------------------
*****************************************
* On amplifier pack [26], on connector     *
* H1146A make certain that resistance is   *
* not zero between pins 7 and 13, and      *
* between pins 4 and 5.                    *
*****************************************
    ||   |               ------------------------------------------
    YES  |-NO-----------| Replace valve [17].                    |
    ||                   ------------------------------------------
    ||
```

Chart 105 (Sheet 2 of 3)

```
    ||
******************************************************
* On connector H1146A make certain that resistance   *
* is not zero between pins 14 and 15, and between    *
* pins 3 and 6.                                      *
******************************************************
    ||   |
    ||   |
    ||   |                ---------------------------------------------
    YES  |-NO-----------| Replace valve [18].                         |
    ||                    ---------------------------------------------
    ||
    ||
    ||                    ---------------------------------------------
    ||------------------| Replace amplifier pack [26].                |
                          ---------------------------------------------
```

Chart 105 (Sheet 3 of 3)

```
*************************************-------------------------------
* SYSTEM SELECT SWITCHES IN SYS 1    *| GROUND EQUIPMENT REQUIRED  |
* POSITION. POSITION INDICATOR [27]  *------------------------------
* DISPLAYS :                         *| DESCRIPTION       PART NO. |
* - SYS 1 FWD - SHUT, SYS 1 AFT -SHUT*------------------------------
* - SYS 2 FWD - OPEN, SYS 2 AFT -OPEN*| MULTIMETER                 |
*************************************-------------------------------
***************************************************
* At valves [17, 18], listen to sound of vacuum pumps*
* [21, 22] rotating. Vacuum pumps rotate.         *
***************************************************
    ||  |                -----------------------------------
    YES |-NO-------------| Replace circuit breaker [9].     |
    ||                   ===================================
***************************************************
* On front of amplifier pack [26] measure voltage   *
* between pins U and R.                           *
***************************************************
    ||  |                -----------------------------------
  115 V |-0 V------------| Replace circuit breaker [4].     |
    ||                   -----------------------------------
***************************************************
* Switch [13] in NORM position. Remove amplifier    *
* pack [26]. Measure voltage between terminal 9 on  *
* connector H1146A and chassis.                   *
***************************************************
    ||  |     **************************************************
  28 V  0 V--* On switch [13] measure voltage between terminal 1  *
    ||        * and aircraft ground.                            *
    ||        **************************************************
    ||          ||   |    *****************************************
    ||        28 V   |0 V* On switch [13] measure voltage between   *
    ||          ||        * terminal 2 and aircraft ground.        *
    ||          ||        *****************************************
    ||  ******************************       ||                |
    ||  * Open access door 123AB. In relay *  ||                |
    ||  * box 2-123, on test connector    *  ||                |
    ||  * UT1837 measure voltage between  *  ||                |
    ||  * terminals 3A and 3B.            *  ||                |
    ||  ******************************       ||                |
    ||       ||   |                          ||                |
    ||       ||   |                          ||                |
    ||     28 V 0 V                        28 V              0 V
    ||       ||   |                          ||                |
    ||       ||   |                          ||                |
```

Chart 106 (Sheet 1 of 2)

```
     ||        ||    |                           ||         |
     ||        ||    |                           ||         |
     ||        ||    |                           ||         |
     ||        ||    |    ------------------------------------
     ||        ||    |    | Replace switch [13].            |  |
     ||        ||    |    ------------------------------------   |
     ||        ||    |    ---------------------------------------------
     ||        ||    |    | Replace circuit breaker [34].             |
     ||        ||    |    ---------------------------------------------
     ||        ||    |    ---------------------------------------------
     ||        ||    |----| Ref. 32-61-00, Trouble Shooting           |
     ||        ||         ---------------------------------------------
     ||        ||
     ||   ***********************************
     ||   * In relay box 3-123, on test     *
     ||   * connector UT1838 measure voltage *
     ||   * between terminals 13A and 13D   *
     ||   ***********************************
     ||        ||    |    ---------------------------------------------
     ||      28 V    |0 V-| Replace relays [48] and [50]              |
     ||        ||         ---------------------------------------------
     ||        ||         ---------------------------------------------
     ||        ||--------| Ref. 32-61-00, Trouble Shooting           |
     ||                   ---------------------------------------------
*****************************************************
* On amplifier pack [26], on connector H1146A make  *
* certain that resistance is not zero between pins  *
* 7 and 13, and between pins 4 and 5.               *
*****************************************************
     ||   |               ---------------------------------------------
    YES   |-NO-----------| Replace valve [17].                        |
     ||                   ---------------------------------------------
*****************************************************
* On connector H1146A make certain that resistance  *
* is not zero between pins 14 and 15, and between   *
* pins 3 and 6.                                     *
*****************************************************
     ||   |               ---------------------------------------------
    YES   |-NO-----------| Replace valve [18].                        |
     ||                   ---------------------------------------------
     ||                   ---------------------------------------------
     ||-----------------| Replace amplifier pack [26].               |
                          ---------------------------------------------
```

Chart 106 (Sheet 2 of 2)

```
*************************************----------------------------------
* SYSTEM SELECT SWITCHES IN SYS 2    *| GROUND EQUIPMENT REQUIRED  |
* POSITION. POSITION INDICATOR [27]  *----------------------------------
* DISPLAYS :                         *| DESCRIPTION       PART NO. |
* - SYS 1 FWD - OPEN, SYS 1 AFT -OPEN*----------------------------------
* - SYS 1 FWD - SHUT, SYS 1 AFT -SHUT*| MULTIMETER                   |
*************************************----------------------------------
*****************************************************
* Place switch [13] in EMERG DEPRESS position.      *
* SYS 2 FWD and AFT tapes remain in SHUT position.  *
*****************************************************
    ||  |         ****************************************
    YES |-NO------* Check diode [38]. Diode is OK.       *
    ||            ****************************************
    ||               || |     ----------------------------------
    ||              YES |-NO-| Replace diode [38].              |
    ||               ||        ----------------------------------
    ||  *********************************************
    ||  * On switch [13] measure voltage between terminal *
    ||  * 7 and aircraft ground.                          *
    ||  *********************************************
    ||       ||   |         ---------------------------------
    ||      28 V  |-0 V-----| Replace switch [13].          |
    ||       ||             ---------------------------------
    ||  *********************************************
    ||  * Open access door 123AB. In relay box 2-123, on  *
    ||  * test connector UT1837, measure voltage between  *
    ||  * pins 3A and 3B.                                 *
    ||  *********************************************
    ||       ||   |         ---------------------------------
    ||      28 V  |-0 V-----| Ref. 32-61-00, Trouble Shooting |
    ||       ||             ---------------------------------
    ||  *********************************************
    ||  * In relay box 3-123, on test connector UT1838,   *
    ||  * measure voltage between pins 13A and 13D.       *
    ||  *********************************************
    ||       ||   |         ---------------------------------
    ||      28 V  |-0 V-----| Ref. 32-61-00, Trouble Shooting |
    ||       ||             ---------------------------------
    ||       ||             ---------------------------------
    ||       ||-------------| Replace relays [47] and [49].  |
    ||                      ---------------------------------
    ||
```

Chart 107 (Sheet 1 of 2)

```
    ||
    ||
    ||
*****************************************************
* At valves [19, 20] listen to sound of vacuum pumps *
* [23,24] rotating. Vacuum pumps rotate.            *
*****************************************************
    ||  |                  ---------------------------------------
   YES  |-NO---------------| Replace circuit breaker [5].        |
    ||                     ---------------------------------------
*****************************************************
* On front of amplifier pack [33] measure voltage   *
* between pins U and R.                             *
*****************************************************
    ||  |                  ---------------------------------------
  115 V |-0 V--------------| Replace circuit breaker [36].       |
    ||                     ---------------------------------------
*****************************************************
* Remove amplifier pack [33]. On connector H1156A   *
* make certain that resistance is not zero between  *
* pins 7 and 13, and between pins 4 and 15.         *
*****************************************************
    ||  |                  ---------------------------------------
   YES  |-NO---------------| Replace valve [19].                 |
    ||                     ---------------------------------------
*****************************************************
* On connector H1156A make certain that resistance  *
* is not zero between pins 14 and 15, and between   *
* pins 3 and 6.                                     *
*****************************************************
    ||  |                  ---------------------------------------
   YES  |-NO---------------| Replace valve [20].                 |
    ||                     ---------------------------------------
    ||                     ---------------------------------------
    ||---------------------| Replace amplifier pack [33].        |
                           ---------------------------------------
```

Chart 107 (Sheet 2 of 2)

```
**************************************-----------------------------------
* SYSTEM SELECT SWITCHES IN SYS 1    *| GROUND EQUIPMENT REQUIRED  |
* POSITION. POSITION INDICATOR [27]  *-----------------------------------
* DISPLAYS :                         *| DESCRIPTION        PART NO. |
* - SYS 1 FWD - OPEN, SYS 1 AFT -OPEN*-----------------------------------
* - SYS 2 FWD - SHUT, SYS 2 AFT -SHUT*| MULTIMETER                  |
**************************************-----------------------------------
*****************************************************
* Place SYSTEM SELECT switches in SYS 2 position.   *
* SYS 2 FWD and AFT tapes remain in SHUT position.  *
*****************************************************
    || |         ********************************************
    || |         * Open access door 123AB. In relay box 2-123, on *
   YES |-NO------* test connector UT1837, measure voltage between *
    ||           * pins 3A and 3B.                                *
    ||           ********************************************
    ||             || |     ----------------------------------
    ||            28V |-0V-| Ref. 32-61-00, Trouble Shooting  |
    ||             ||       ----------------------------------
    ||             ||       ----------------------------------
    ||             ||------| Replace relay [46].              |
    ||                     | Ref. 32-00-00, Removal/Installation |
    ||                      ----------------------------------
*****************************************************
* Place switch [13] in EMERG DEPRESS position.      *
* SYS 2 FWD and AFT tapes remain in SHUT position.  *
*****************************************************
    || |         ********************************************
   YES |-NO------* Check diode [38]. Diode is OK.            *
    ||           ********************************************
    ||             || |     ----------------------------------
    ||            YES |-NO-| Replace diode [38].              |
    ||             ||       ----------------------------------
    ||   *********************************************
    ||   * Measure voltage between terminal 7 on     *
    ||   * switch [13] and aircraft ground.          *
    ||   *********************************************
    ||             || |     ----------------------------------
    ||            YES |-NO-| Replace switch [13].             |
    ||             ||       ----------------------------------
    ||   *********************************************
    ||   * Open access door 123AB. In relay box      *
    ||   * 2-123, on test connector UT1837, measure  *
    ||   * voltage between pins 3A and 3B.           *
    ||   *********************************************
    ||           ||       |
    ||           ||       |
    ||          115 V    0 V
    ||           ||       |
```

Chart 108 (Sheet 1 of 3)

```
     ||          ||        |
     ||          ||        |   ---------------------------------------
     ||          ||        |-| Ref. 32-61-00, Trouble Shooting       |
     ||          ||            ---------------------------------------
     ||   ***********************************************
     ||   * In relay box 3-123, on test connector      *
     ||   * UT1838, measure voltage between pins 13A   *
     ||   * and 13D.                                   *
     ||   ***********************************************
     ||          ||    |       ---------------------------------------
     ||          28 V  |-0V-| Ref. 32-61-00, Trouble Shooting       |
     ||          ||            ---------------------------------------
     ||          ||            ---------------------------------------
     ||          ||--------| Replace relays [47] and [49].          |
     ||                    | Ref. 32-00-00, Removal/Installation    |
     ||                        ---------------------------------------
*****************************************************
* At valves [19, 20], listen to sound of vaccum pumps*
* [23, 24] rotating. Vacuum pumps rotate.           *
*****************************************************
     ||  |                     ---------------------------------------
     YES |-NO---------------| Replace circuit breaker [5].          |
     ||                        ---------------------------------------
*****************************************************
* On front of amplifier pack [33] measure voltage   *
* between pins U and R.                             *
*****************************************************
     ||  |                     ---------------------------------------
   115 V|-0 V---------------| Replace circuit breaker [36].         |
     ||                        ---------------------------------------
*****************************************************
* Remove amplifier pack [33]. On connector H1156A   *
* make certain that resistance is not zero between  *
* pins 7 and 13, and between pins 4 and 15.         *
*****************************************************
     ||  |                     ---------------------------------------
     YES |-NO---------------| Replace valve [19].                   |
     ||                        ---------------------------------------
     ||
     ||
```

Chart 108 (Sheet 2 of 3)

```
**************************************************
* On connector H1156A make certain that resistance   *
* is not zero between pins 14 and 15, and between    *
* pins 3 and 6.                                       *
**************************************************
    ||  |
    ||  |
    ||  |              ------------------------------------------
   YES  |-NO-----------| Replace valve [20].                     |
    ||                 ------------------------------------------
    ||
    ||
    ||                 ------------------------------------------
    ||-----------------| Replace amplifier pack [33].            |
                       ------------------------------------------
```

Chart 108 (Sheet 3 of 3)

```
*************************************-------------------------------
* SWITCH [14] IN FWD SHUT THEN AFT   *| GROUND EQUIPMENT REQUIRED  |
* SHUT POSITION. POSITION INDICATOR  *-------------------------------
* [27] DISPLAYS :                    *| DESCRIPTION       PART NO. |
* - SYS 1 FWD - OPEN, SYS 1 AFT -OPEN*-------------------------------
* - SYS 2 FWD - OPEN, SYS 2 AFT -OPEN*| MULTIMETER                 |
*************************************-------------------------------
*****************************************************
* Check circuit breaker [7]. Circuit breaker is     *
*****************************************************
    ||   |
    ||   |
    ||   |                  ----------------------------------
   OK    |--NOT OK----------| Replace circuit breaker [7].   |
    ||                      ----------------------------------
    ||                      ----------------------------------
    ||----------------------| Replace switch [14].           |
                            ----------------------------------
```

CORRESPONDENCE WITH SYSTEM 2.	
CIRCUIT BREAKER	H1124 [6]
SWITCH	H1135 [15]
POSITION INDICATOR [27] displays : SYS 1 FWD - OPEN, SYS 1 AFT - OPEN SYS 2 FWD - OPEN, SYS 2 AFT - OPEN	

Chart 109

* SWITCH [14] IN FWD SHUT THEN AFT SHUT POSITION. POSITION INDICATOR [27] DISPLAYS :
- SYS 1 FWD - OPEN,

THEN :
- SYS 1 AFT - SHUT,

AND IN BOTH POSITIONS :
- SYS 2 FWD - OPEN, SYS 2 AFT -OPEN

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	

* Disconnect connector H1137B from valve [17]. On connector H1137B measure voltage between pins E and D.

28 V → 0 V → Replace switch [14].

→ Replace valve [17].

CORRESPONDENCE WITH SYSTEM 2	
VALVE	H1139 [19]
CONNECTOR	H1139A
SWITCH	H1135 [15]
POSITION INDICATOR [27] displays : SYS 2 FWD - OPEN, then : SYS 2 AFT - SHUT, and in both positions : SYS 1 FWD - OPEN, SYS 1 AFT - OPEN	

Chart 110

```
**************************************-----------------------------------
* SWITCH [14] IN FWD SHUT THEN AFT    *| GROUND EQUIPMENT REQUIRED  |
* SHUT POSITION. POSITION INDICATOR   *-----------------------------------
* [27] DISPLAYS :                     *| DESCRIPTION        PART NO. |
* - SYS 1 FWD - SHUT,                 *-----------------------------------
* THEN :                              *| MULTIMETER                  |
* - SYS 1 AFT - OPEN,                 *-----------------------------------
* AND IN BOTH POSITIONS :             *
* - SYS 2 FWD - OPEN, SYS 2 AFT -OPEN*
**************************************
*******************************************************
* Disconnect connector H1138B from valve [18]. On    *
* connector H1138B measure voltage between pins D    *
* and E.                                              *
*******************************************************
    ||   |
    ||   |
    ||   |                       -----------------------------------
  28 V  |-------0 V--------------| Replace switch [14].             |
    ||                           -----------------------------------
    ||
    ||                           -----------------------------------
    ||---------------------------| Replace valve [18].              |
                                 -----------------------------------
```

CORRESPONDENCE WITH SYSTEM 2.	
VALVE	H1140 [20]
CONNECTOR	H1140A
SWITCH	H1135 [15]
POSITION INDICATOR [27] displays : SYS 2 FWD - SHUT, then : SYS 2 AFT - OPEN, and in both positions : SYS 1 FWD - SHUT, SYS 1 AFT - OPEN	

Chart 111

```
*************************************-----------------------------
* SYSTEM SELECT SWITCHES IN SYS 1    *| GROUND EQUIPMENT REQUIRED |
* POSITION. THROTTLE CONTROL LEVER(S)*----------------------------
* IN MAXIMUM THRUST POSITION.        *| DESCRIPTION      PART NO. |
* POSITION INDICATOR [27] DISPLAYS : *----------------------------
* - SYS 1 FWD - OPEN, SYS 1 AFT -OPEN*| MULTIMETER                |
* - SYS 2 FWD - SHUT, SYS 2 AFT -SHUT*----------------------------
* GROUND PRESSURE RELIEF VALVE       *
* MAGNETIC INDICATOR DISPLAYS SHUT.  *
*************************************
*****************************************************
* Remove amplifier pack [26]. Measure voltage       *
* between pin 10 on connector H1146A and aircraft   *
* ground.                                           *
*****************************************************
    ||   |
    ||   |
    ||   |                         -----------------------------------
  28 V   |-------0 V--------------| Replace switch [12].              |
    ||                             -----------------------------------
    ||
    ||
    ||                             -----------------------------------
    ||----------------------------| Replace amplifier pack [26].      |
                                   -----------------------------------
```

Chart 112

```
*************************************-------------------------------
* SYSTEM SELECT SWITCHES IN SYS 1    *| GROUND EQUIPMENT REQUIRED  |
* POSITION. THROTTLE CONTROL LEVER(S)*-------------------------------
* IN MAXIMUM THRUST POSITION.        *| DESCRIPTION       PART NO. |
* POSITION INDICATOR [27] DISPLAYS : *-------------------------------
* - SYS 1 FWD - SHUT, SYS 1 AFT -SHUT*| MULTIMETER                 |
* - SYS 2 FWD - OPEN, SYS 2 AFT -OPEN*-------------------------------
* GROUND PRESSURE RELIEF VALVE       *
* MAGNETIC INDICATOR DISPLAYS SHUT   *
*************************************
*****************************************************
* Remove amplifier pack [33]. Measure voltage       *
* between pin 11 on connector H1156A and aircraft   *
* ground.                                           *
*****************************************************
    ||  |
    ||  |            ***************************************************
    ||  |            * Place SYSTEM SELECT switches in SYS 2 position *
   28 V |--0 V-----* Measure voltage between pin 10 on connector    *
    ||               * H1156A and aircraft ground.                    *
    ||               ***************************************************
    ||                  || |
    ||                  || |     ---------------------------------------
    ||                  || |     | Replace the throttle control lever  |
    ||                  28V |-0V-| microswitch(es) [51] or [52] or [53] |
    ||                  ||       | or [54].                            |
    ||                  ||       ---------------------------------------
    ||                  ||
    ||                  ||       ---------------------------------------
    ||                  ||------| Replace switch [37].                 |
    ||                           ---------------------------------------
    ||
    ||                           ---------------------------------------
    ||-------------------------| Replace amplifier pack [33].         |
                                 ---------------------------------------
```

Chart 113

```
**************************************-------------------------------
* SYSTEM SELECT SWITCHES IN SYS 2    *| GROUND EQUIPMENT REQUIRED  |
* POSITION. THROTTLE CONTROL LEVER(S)*-------------------------------
* IN MAXIMUM THRUST POSITION.        *| DESCRIPTION       PART NO. |
* POSITION INDICATOR [27] DISPLAYS : *-------------------------------
* - SYS 1 FWD - SHUT, SYS 1 AFT -SHUT*| MULTIMETER                 |
* - SYS 2 FWD - OPEN, SYS 2 AFT -OPEN*-------------------------------
* GROUND PRESSURE RELIEF VALVE       *
* MAGNETIC INDICATOR DISPLAYS SHUT   *
**************************************
******************************************************
* Remove amplifier pack [33]. Measure voltage        *
* between pin 10 on connector H1156A and aircraft    *
* ground.                                            *
******************************************************
    ||  |
    ||  |              ***********************************************
    ||  |              * Place SYSTEM SELECT switches in SYS 1 position.*
   28 V |--0 V----* Measure voltage between pin 11 on connector    *
    ||                 * H1156A and aircraft ground.                    *
    ||                 ***********************************************
    ||                      || |
    ||                      || |      ----------------------------------------
    ||                      || |      | Replace throttle control lever       |
    ||                     28V |-0V-| microswitch(es) [51] or [52] or [53] |
    ||                      ||        | or [54].                             |
    ||                      ||        ----------------------------------------
    ||                      ||
    ||                      ||        ----------------------------------------
    ||                      ||------| Replace switch [37].                 |
    ||                                ----------------------------------------
    ||
    ||                                ----------------------------------------
    ||----------------------| Replace amplifier pack [33].         |
                                      ----------------------------------------
```

Chart 114

```
**************************************-------------------------------
* SYSTEM SELECT SWITCHES IN SYS 2    *| GROUND EQUIPMENT REQUIRED    |
* POSITION. THROTTLE CONTROL LEVER(S)*|------------------------------|
* IN MAXIMUM THRUST POSITION.        *| DESCRIPTION       PAR NO.    |
* POSITION INDICATOR [27] DISPLAYS : *|------------------------------|
* -SYS 1 FWD - OPEN, SYS 1 AFT - OPEN*| MULTIMETER                   |
* -SYS 2 FWD - SHUT, SYS 2 AFT - SHUT*-------------------------------
* GROUND PRESSURE RELIEF VALVE       *
* MAGNETIC INDICATOR DISPLAYS SHUT.  *
**************************************
******************************************************
* Remove amplifier pack [26]. Measure voltage        *
* between pin 11 on connector H1146A and aircraft    *
* ground.                                            *
******************************************************
     ||   |
     ||   |             *******************************************
     ||   |             * Place SYSTEM SELECT switches in SYS 1 position *
    28V   |----OV---* Measure voltage between pin 10 on connector    *
     ||                 * H1146A and aircraft ground.                    *
     ||                 *******************************************
     ||                    || |
     ||                    || |       ---------------------------------------
     ||                    || |       | Replace throttle control lever       |
     ||                   28V |-OV-| microswitch(es) [51] or [52] or [53] |
     ||                    ||         | or [54].                             |
     ||                    ||         ---------------------------------------
     ||                    ||
     ||                    ||         ---------------------------------------
     ||                    ||------| Replace switch [12].                 |
     ||                               ---------------------------------------
     ||
     ||                               ---------------------------------------
     ||----------------------| Replace amplifier pack [26].         |
                                      ---------------------------------------
```

Chart 115

```
****************************************
* SYSTEM SELECT SWITCHES IN SYS 1      *
* POSITION. THROTTLE CONTROL LEVER(S)*
* IN MAXIMUM THRUST POSITION.          *
* POSITION INDICATOR [27] DISPLAYS :   *
* -SYS 1 FWD - SHUT                    *
* -SYS 1 AFT - OPEN OR 50%             *
* -SYS 2 FWD - SHUT, SYS 2 AFT - SHUT*
* GROUND PRESSURE RELIEF VALVE         *
* MAGNETIC INDICATOR DISPLAYS SHUT     *
****************************************
*******************************************************
* Remove amplifier pack [26].                         *
* Remove amplifier pack [33] and install in place of *
* amplifier pack [26].                                *
* SYS 1 AFT tape moves to SHUT position.              *
*******************************************************
     ||   |
     ||   |
     ||   |                   ----------------------------------------
    YES   |---NO--------------| Replace valve [18].                  |
     ||                       ----------------------------------------
     ||                       ----------------------------------------
     ||-----------------------| Replace amplifier pack [26].         |
                              ----------------------------------------
```

CORRESPONDENCE WITH SYSTEM 2	
VALVE	H1140 [20]
POSITION INDICATOR [27] displays : SYS 1 FWD - SHUT. SYS 1 AFT - OPEN or 50%. SYS 2 FWD - SHUT, SYS 2 AFT - SHUT.	

Chart 116

```
***************************************
* SYSTEM SELECT SWITCHES IN SYS 1     *
* POSITION. THROTTLE CONTROL LEVER(S) *
* IN MAXIMUM THRUST POSITION.         *
* POSITION INDICATOR [27] DISPLAYS :  *
* -SYS 1 FWD - SHUT, SYS 1 AFT - SHUT *
* -SYS 2 FWD - SHUT.                  *
* -SYS 2 AFT - OPEN OR 50%            *
* GROUND PRESSURE RELIEF VALVE        *
* MAGNETIC INDICATOR DISPLAYS SHUT.   *
***************************************
******************************************************
* Remove amplifier pack [33].                        *
* Remove amplifier pack [26] and install in place of *
* amplifier pack [33].                               *
* SYS 2 AFT tape moves to SHUT position.             *
******************************************************
    ||   |
    ||   |                   ----------------------------------------
   YES   |--NO---------------| Replace valve [20].                  |
    ||                       ----------------------------------------
    ||
    ||                       ----------------------------------------
    ||-----------------------| Replace amplifier pack [33].         |
                             ----------------------------------------
```

CORRESPONDENCE WITH SYSTEM 2	
VALVE	H1138 [18]
POSITION INDICATOR [27] displays : SYS 1 FWD - SHUT, SYS 1 AFT - SHUT. SYS 2 FWD - SHUT. SYS 2 AFT - OPEN or 50%.	

Chart 117

```
************************************
* SYSTEM SELECT SWITCHES IN SYS 1    *
* POSITION. POSITION INDICATOR [27]  *
* DISPLAYS :                         *
* -SYS 1 FWD - OPEN, SYS 1 AFT - OPEN*
* -SYS 2 FWD - SHUT, SYS 2 AFT - SHUT*
* CLIMB INDICATOR [42] INDICATES UP. *
* CABIN ALTIMETER [41] INDICATES     *
* HIGH ALTITUDE.                     *
* CABIN DIFFERENTIAL PRESSURE        *
* INDICATOR [44] INDICATES LOW ΔP.   *
* GROUND PRESSURE RELIEF VALVE       *
* INDICATOR DISPLAYS SHUT.           *
* EXCESS ALT WARNING LIGHT [2] AND   *
* PRESS WARNING LIGHT ON MASTER WAR- *
* NING PANEL ILLUMINATED : ASSO-     *
* CIATED AURAL WARNINGS SOUND.       *
************************************
        |
        |-NO----------------| Replace amplifier pack [26].        |
```

CORRESPONDENCE WITH SYSTEM 2	
AMPLIFIER PACK	H1156 [33]
POSITION INDICATOR [27] displays : SYS 1 FWD - SHUT, SYS 1 AFT - SHUT SYS 2 FWD - OPEN, SYS 2 AFT - OPEN	

Chart 118

```
**************************************
* SYSTEM SELECT SWITCHES IN SYS 1    *
* POSITION. POSITION INDICATOR [27]  *
* DISPLAYS :                         *
* -SYS 1 FWD - SHUT, SYS 1 AFT - SHUT*
* -SYS 2 FWD - SHUT, SYS 2 AFT - SHUT*
* CLIMB INDICATOR [42] INDICATES     *
* DOWN.                              *
* CABIN ALTIMETER [41] INDICATES     *
* LOW ALTITUDE.                      *
* CABIN DIFFERENTIAL PRESSURE        *
* INDICATOR [44] INDICATES HIGH ΔP.  *
* GROUND PRESSURE RELIEF VALVE       *
* MAGNETIC INDICATOR DISPLAYS SHUT.  *
* OVER PRESS WARNING LIGHT [16] AND  *
* PRESS WARNINGS LIGHT ON MASTER     *
* WARNING PANEL ILLUMINATED ;        *
* ASSOCIATED AURAL WARNINGS SOUND.   *
**************************************
******************************************************
* With aircraft on ground, SYS 1 FWD and AFT tapes   *
* are in OPEN position.                              *
******************************************************
    ||  |            ******************************************************
    YES |----NO---* On front of amplifier pack [26], on connector *
    ||               * H1146B, measure voltage between pins U and R.  *
    ||               ******************************************************
    ||                 || |      ----------------------------------------
    ||                 28V|-0V-| Replace circuit breaker [4].           |
    ||                 ||        ----------------------------------------
    ||               ******************************************************
    ||               * Remove amplifier pack [26]. On connector H1146A*
    ||               * make certain that resistance is not zero       *
    ||               * between pins 7 and 13, and between pins 4      *
    ||               * and 5.                                         *
    ||               ******************************************************
    ||                 || |      ----------------------------------------
    ||                 YES|-NO-| Replace valve [17].                    |
    ||                 ||        ----------------------------------------
    ||               ******************************************************
    ||               * On connector H1146A make certain that          *
    ||               * resistance is not zero between pins 14 and 15, *
    ||               * and between pins 3 and 6.                      *
    ||               ******************************************************
    ||                 || |      ----------------------------------------
    ||                 YES|-NO-| Replace valve [18].                    |
    ||                 ||        ----------------------------------------

    ||
```

Chart 119 (Sheet 1 of 2)

Replace amplifier pack [26].

Replace selector [25].

CORRESPONDENCE WITH SYSTEM 2	
AMPLIFIER PACK	H1156 [33]
CONNECTOR	H1156A
VALVE	H1139 [19]
VALVE	H1140 [20]
SELECTOR	H1148 [28]
POSITION INDICATOR [27] displays : SYS 1 FWD - SHUT, SYS 1 AFT - SHUT. SYS 2 FWD - SHUT, SYS 2 AFT - SHUT.	

Chart 119 (Sheet 2 of 2)

```
************************************=============================
* SYSTEM SELECT SWITCHES IN SYS 1    *| GROUND EQUIPMENT REQUIRED |
* POSITION. SWITCH [13] IN EMERG     *|---------------------------|
* DEPRESS POSITION. POSITION         *| DESCRIPTION      PART NO. |
* INDICATOR [27] DISPLAYS :          *|---------------------------|
* -SYS 1 FWD - REGULATING            *| MULTIMETER                |
* -SYS 1 AFT - REGULATING            *-----------------------------
* -SYS 2 FWD - SHUT, SYS 2 AFT - SHUT*
* GROUND PRESSURE RELIEF VALVE       *
* MAGNETIC INDICATOR DISPLAYS SHUT.  *
**************************************
*****************************************************
* With aircraft on ground, SYS 2 FWD and AFT tapes  *
* are in OPEN position.                             *
*****************************************************
    ||   |        **********************************************
    YES  |--NO-----* On front of amplifier pack [33], on connector *
    ||             * H1156B, measure voltage between pins U and R.  *
    ||             **********************************************
    ||               ||    |      ------------------------------
    ||               115V  |--0V---| Replace circuit breaker [36].  |
    ||               ||           ------------------------------
    ||             **********************************************
    ||             * Remove amplifier pack [33]. On connector H1156A*
    ||             * make certain that resistance is not zero       *
    ||             * between pins 7 and 13, and between pins 4      *
    ||             * and 5.                                         *
    ||             **********************************************
    ||               ||   |       ------------------------------
    ||               YES  |---NO---| Replace valve [19].            |
    ||               ||           ------------------------------
    ||             **********************************************
    ||             * On connector H1156A make certain that          *
    ||             * resistance is not zero between pins 14 and 15  *
    ||             * and between pins 3 and 6.                      *
    ||             **********************************************
    ||               ||   |       ------------------------------
    ||               YES  |---NO---| Replace valve [20].            |
    ||               ||           ------------------------------
    ||               ||           ------------------------------
    ||               ||-----------| Replace amplifier pack [33].   |
    ||                            ------------------------------
*****************************************************
* Check that diode [40] is OK.                      *
*****************************************************
    ||        |
    YES       NO
```

Chart 120 (Sheet 1 of 2)

```
||          |
||          |
||          |
||          |
||          |           ----------------------------------------
||          |-----------| Replace diode [40].                  |
||                      ----------------------------------------
||
||
||                      ----------------------------------------
||----------------------| Replace switch [13].                 |
                        ----------------------------------------
```

Chart 120 (Sheet 2 of 2)

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```
*************************************-------------------------------
* SYSTEM SELECT SWITCHES IN SYS 1   *| GROUND EQUIPMENT REQUIRED    |
* POSITION. SWITCH [13] IN EMERG    *|------------------------------|
* DEPRESS POSITION. POSITION        *| DESCRIPTION        PART NO.  |
* INDICATOR [27] DISPLAYS :         *|------------------------------|
* -SYS 1 FWD - REGULATING           *| MULTIMETER                   |
* -SYS 1 AFT - REGULATING           *-------------------------------
* -SYS 2 FWD - PARTLY OPEN          *
* -SYS 2 AFT - PARTLY OPEN          *
* CLIMB INDICATOR [42] INDICATES    *
* APPROXIMATELY 800 FT/MIN.         *
*************************************
******************************************************
* With aircraft on ground, SYS 2 FWD and AFT tapes   *
* are in OPEN position.                              *
******************************************************
    ||   |
    ||   |                  ----------------------------------
   YES   |----NO------------| Replace amplifier pack [33].   |
    ||                      ----------------------------------
    ||
    ||                      ----------------------------------
    ||----------------------| Replace diode [40].            |
    ||                      ----------------------------------
    ||
******************************************************
* On relay [39] measure voltage between terminals    *
* A and B.                                           *
******************************************************
    ||   |
    ||   |                  ----------------------------------
    ||   |                  | Check wiring in accordance with |
   28V   |----0V------------| wiring diagram manual.          |
    ||                      | Ref. Table 101.                 |
    ||                      ----------------------------------
    ||
    ||                      ----------------------------------
    ||----------------------| Replace relay [39].            |
                            ----------------------------------
```

Chart 121

```
****************************************
* CABIN ALTIMETER [41] INDICATES       *
* NORMAL ALTITUDE.                     *
* CABIN DIFFERENTIAL PRESSURE          *
* INDICATOR [44] INDICATES ΔP LESS     *
* THAN 757 MB.                         *
* OVER PRESS WARNING LIGHT [16] AND    *
* PRESS WARNING LIGHT ON MASTER        *
* WARNING PANEL ILLUMINATED ;          *
* ASSOCIATED AURAL WARNINGS SOUND.     *
****************************************
********************************************************
* In workshop, remove valve [17]. Check release        *
* value of pressure limiter, which must be more than   *
* 759 mb. Valve [17] is OK.                            *
********************************************************
    ||   |
    ||   |
    ||   |                      --------------------------------------
    YES  |----NO----------------| Replace valve [17].                |
    ||                          --------------------------------------
    ||
    ||                          --------------------------------------
    ||--------------------------| Replace valve [19].                |
                                --------------------------------------
```

Chart 122

```
**************************************=================================
* CABIN DIFFERENTIAL PRESSURE         *| GROUND EQUIPMENT REQUIRED     |
* INDICATOR [44] INDICATES ΔP MORE    *|-------------------------------|
* THAN 759 MB.                        *| DESCRITION          PART NO.  |
* CABIN ALTITUDE LOW.                 *|-------------------------------|
* OVER PRESS WARNING LIGHT [16] AND   *| MULTIMETER                    |
* PRESS WARNING LIGHT NOT             *---------------------------------
* ILLUMINATED : AURAL WARNINGS DO NOT*
* SOUND.                              *
**************************************
*****************************************************
* OVER PRESS warning light/switch module [16] comes *
* on when pressed, as does PRESS warning light.     *
*****************************************************
    ||  |
    ||  |
    ||  |                *****************************************
    ||  |                * Measure voltage between terminal 9 on OVER  *
    YES |----NO---* PRESS warning light/switch module [16] and  *
    ||                   * aircraft ground.                            *
    ||                   *****************************************
    ||                     ||  |
    ||                     ||  |            ---------------------------------
    ||                     28V|--0V-----| Replace circuit breaker [8].    |
    ||                     ||               ---------------------------------
    ||                     ||
    ||                     ||               ---------------------------------
    ||                     ||-----------| Replace warning light/switch    |
    ||                                      | module [16].                    |
    ||                                      ---------------------------------
    ||
    ||                                      ---------------------------------
    ||-------------------------------| Carry out trouble shooting as   |
                                            | per Chart 119.                  |
                                            ---------------------------------
```

Chart 123

```
*************************************
* CABIN ALTIMETER [41] INDICATES    *
* ALTITUDE LESS THAN 10,000 FT.     *
* EXCESS ALT WARNING LIGHT [2] AND  *
* PRESS WARNING LIGHT ILLUMINATED : *
* ASSOCIATED AURAL WARNINGS SOUND.  *
*************************************
                          ---------------------------------
                          | Replace altitude switch [3].  |
                          ---------------------------------
```

Chart 124

```
*************************************-----------------------------
* CABIN ALTIMETER [41] INDICATES      *| GROUND EQUIPMENT REQUIRED |
* ALTITUDE MORE THAN 10,000 FT.       *|---------------------------|
* EXCESS ALT WARNING LIGHT [2] AND    *| DESCRIPTION       PART NO.|
* PRESS WARNING LIGHT NOT             *|---------------------------|
* ILLUMINATED. AURAL WARNINGS DO NOT  *| MULTIMETER                |
* SOUND.                              *-----------------------------
*************************************
*****************************************************
* EXCESS ALT warning light/switch module [2] comes  *
* on when pressed, as does PRESS warning light.     *
*****************************************************
    ||   |
    ||   |
    ||   |        ***********************************************
    ||   |        * Measure voltage between terminal 9 on EXCESS *
   YES   |----NO---* ALT warning light/switch module [2] and      *
    ||            * aircraft ground.                              *
    ||            ***********************************************
    ||              || |
    ||              || |        ---------------------------------
    ||              28V|--0V-----| Replace circuit breaker [1].  |
    ||              ||          ---------------------------------
    ||              ||
    ||              ||
    ||              ||          ---------------------------------
    ||              ||-----------| Replace warning light/switch  |
    ||                          | module [2].                    |
    ||                          ---------------------------------
    ||
    ||                          ---------------------------------
    ||---------------------------| Replace switch [3].           |
    ||                          ---------------------------------
    ||
    ||                          ---------------------------------
    ||---------------------------| Carry out trouble shooting as |
                                | per Chart 118.                 |
                                ---------------------------------
```

Chart 125

```
*************************************
* CABIN ALTIMETER [41] AND EMERGENCY *
* ALTIMETER [43] INDICATE DIFFERENT  *
* VALUES.                            *
*************************************

*****************************************************
* Check indication of each altimeter against "NORMAL-*
* STANDBY" altimeter on Captain's panel.             *
*****************************************************
                         ||
                         ||
                         ||
                         ||   --------------------------------
                         ||---| Replace defective altimeter [41]|
                              | or [43].                       |
                              --------------------------------
```

Chart 126

```
*************************************-------------------------------
* AIRCRAFT ELECTRICAL NETWORK IS     *| GROUND EQUIPMENT REQUIRED   |
* ENERGIZED. FLAGS ARE DISPLAYED ON  *|-----------------------------|
* POSITION INDICATOR [27].           *| DESCRIPTION       PART NO.  |
*************************************|-----------------------------|
                                     | MULTIMETER                  |
                                     -------------------------------

*****************************************************
* On position indicator [27] disconnect connector    *
* H1147A if system 1 is affected, or connector       *
* H1147B if system 2 is affected. Measure voltage    *
* between pins E and F on relevant connector.        *
*****************************************************
    ||   |
    ||   |                         -----------------------------------
   115V|----0V---------------------| Replace circuit breaker [10]     |
    ||                             | (System 1) or [11] (System 2).   |
    ||                             -----------------------------------
    ||
    ||                             -----------------------------------
    ||-----------------------------| Replace position indicator [27].|
                                   -----------------------------------
```

Chart 127

```
*************************************
* CABIN ALTIMETER [41] INDICATES    *
* STABLE ALTITUDE.                  *
* PASSENGERS AND CREW EXPERIENCE NO *
* DISCOMFORT.                       *
* CLIMB INDICATOR [42] NOT IN ZERO  *
* POSITION.                         *
*************************************
```

Replace climb indicator [42].

Chart 128

```
************************************
* CABIN ALTIMETER [41] INDICATES     *
* STABLE ALTITUDE.                   *
* CABIN DIFFERENTIAL PRESSURE        *
* INDICATOR [44] FUNCTIONS           *
* ABNORMALY.                         *
************************************
```

| Replace indicator [44]. |

Chart 129

4. Component Identification Table

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[1] Circuit breaker		1-213	H1101	G 11	24-50-00 R/I	21-35-12
[2] EXCESS ALT caption light/ switch module		1-214	H1102		21-30-00 R/I	21-35-12
[3] Cabin excess altitude switch	214	9-214	H1103		21-35-41 R/I	21-35-12
[4] Circuit breaker		2-213	H1122	H 16	24-50-00 R/I	21-35-11
[5] Circuit breaker		2-213	H1123	A 16	24-50-00 R/I	21-35-21
[6] Circuit breaker		1-213	H1124	E 13	24-50-00 R/I	21-35-22
[7] Circuit breaker		5-213	H1125	E 8	24-50-00 R/I	21-35-12
[8] Circuit breaker		5-213	H1126	E 9	24-50-00 R/I	21-35-12
[9] Circuit breaker		2-213	H1127	G 17	24-50-00 R/I	21-35-11
[10] Circuit breaker		2-213	H1128	H 17	24-50-00 R/I	21-35-12
[11] Circuit breaker		2-213	H1129	A 17	24-50-00 R/I	21-35-22
[12] Auto-reg. master cont. switch (Sys. 1)		1-214	H1131		21-30-00 R/I	21-35-11
[13] EMERG DEPRESS/NORM/ TEST switch		1-214	H1133		21-30-00 R/I	21-35-11

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
[14] DISCHARGE VALVE SYS 1 (regulating and safety) switch		1-214	H1134		21-30-00 R/I	21-35-12
[15] DISCHARGE VALVES SYS 2 (regulating and safety) switch		1-214	H1135		21-30-00 R/I	21-35-22
[16] OVER PRESS warning light/ switch module		1-214	H1136		21-30-00 R/I	21-35-12
[17] Regulating and safety valve (Sys. 1 Fwd)	131AS		H1137		21-35-12 R/I	21-35-11
[18] Regulating and safety valve (Sys. 1 Aft)	243EF		H1138		21-35-32 R/I	21-35-12
[19] Regulating and safety valve (Sys. 2 Fwd)	131AS		H1139		21-35-12 R/I	21-35-22
[20] Regulating and safety valve (Sys. 2 Aft)	243EF		H1140		21-35-32 R/I	21-35-22
[21] Vacuum pump (Sys. 1 Fwd)	131AS		H1141		21-35-11 R/I	21-35-11
[22] Vacuum pump (Sys. 1 Aft)	243EF		H1142		21-35-31 R/I	21-35-11

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ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[23] Vacuum pump (Sys. 2 Fwd)	131AS		H1143		21-35-11 R/I	21-35-21
[24] Vacuum pump (Sys. 2 Aft)	243EF		H1144		21-35-31 R/I	21-35-21
[25] Cabin pressure regulating selector (Sys. 1)		1-214	H1145		21-35-42 R/I	21-35-11
[26] Cabin pressure control amplifier pack (Sys. 1)		10-215	H1146		21-35-43 R/I	21-35-11
[27] Regulating and safety valve position indicator		1-214	H1147		21-35-44 R/I	21-35-12
[28] Cabin pressure regulating selector (Sys. 2)		1-214	H1148		21-35-42 R/I	21-35-21
[29] Circuit breaker		1-213	H1149		24-30-00 R/I	21-35-12
[30] Circuit breaker		1-213	H1150	F 10	24-30-00 R/I	21-35-22
[31] DITCHING SYS 1 switch		1-214	H1151		21-30-00 R/I	21-35-12
[32] DITCHING SYS 2 switch		1-214	H1152		21-30-00 R/I	21-35-22

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[33] Cabin pressure control amplifier pack (Sys. 2)		10-216	H1156		21-35-43 R/I	21-35-21
[34] Circuit breaker		15-215	H1157	E 3	24-50-00 R/I	21-35-11
[35] Circuit breaker		15-216	H1158	D 23	24-50-00 R/I	21-35-21
[36] Circuit breaker		2-213	H1159	H 15	24-50-00 R/I	21-35-21
[37] Auto-reg. master cont. switch (Sys. 2)		1-214	H1160		21-30-00 R/I	21-35-21
[38] Diode		1-214	H1176		21-30-00 R/I	21-36-11
[39] Relay		17-123	H1177		21-30-00 R/I	21-36-11
[40] Diode		1-214	H1178		21-30-00 R/I	21-36-11
[41] Cabin altimeter		1-214	D191		21-35-45 R/I	
[42] CLIMB indicator		1-214	D192		21-35-47 R/I	
[43] Emergency altimeter		2-211	F48		34-13-21 R/I	
[44] Cabin differential pressure indicator		1-214	D194		21-35-46 R/I	
[45] Relay	123AB		G301		32-00-00 R/I	21-35-11

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
[46] Relay	123AB		G302		32-00-00 R/I	21-35-21
[47] Relay	123AB		G303		32-00-00 R/I	21-35-21
[48] Relay	123AB		G304		32-00-00 R/I	21-35-21
[49] Relay	123AB		G317		32-00-00 R/I	21-35-21
[50] Relay	123AB		G318		32-00-00 R/I	21-35-21
[51] Forward thrust micro-switch box No.1	211CS	9-211	1k1548		76-15-12 R/I	21-35-11 21-35-21
[52] Forward thrust micro-switch box No.2	211CS	9-211	2K1548		76-15-12 R/I	21-35-11 21-35-21
[53] Forward thrust micro-switch box No.3	212CS	9-211	3K1548		76-15-12 R/I	21-35-11 21-35-21
[54] Forward thrust micro-switch box No.4	212CS	9-211	4K1548		76-15-12 R/I	21-35-11 21-35-21

Component Identification
Table 101

PRESSURE CONTROL - ADJUSTMENT/TEST

1. General

R This topic describes the test performed on the following
R circuits :
R - Functional test of overpressure indicating
- Functional test of ditching control
- Functional test of DISCHARGE VALVES indicating
- Functional test of system 2 pressure control
- Functional test of cabin quick depressurization system and AIR/GROUND landing gear relays
- Test of microswitches on throttle control levers
- Opening test of cabin pressure variation rate system
- Functional test of EXCESS ALT indicating system

2. Functional Test

A. Equipment and Materials

	DESCRIPTION	PART NO.
R	- Electrical Ground Power Unit	
R	- Multimeter	
R	- Cabin Pressurizing Unit	
R	- Pressure Generator	
R	- Ground Service Telephone	
R	- Adapter - Ventilation System	D921625001
R	- Access Platform 3.22 m (10.7 ft)	
R	- Circuit Breaker Safety Clips	

B. Prepare

(1) Check that the following circuit breakers are set :

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R	SYS2 & FWD AFT DISCHARGE VALVE SUP	1-213	H1124	E13
	SYS2 DITCHING VALVE CONT		H1150	F10

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
	CABIN EXCESS ALT WARN. IND		H1101	G11
	SYS1 DITCHING VALVE CONT		H1149	G13
R	DE-PRESSN MOTOR 1 SUP CONT IND		H1163	H12
R	DE-PRESSN MOTOR 2 SUP CONT IND		H1164	H13
	LH U/C WEIGHT SW "A" SYS SUP		G 292	M17
R R	RH U/C WEIGHT SW & DOWNLOCK A SYS SUP		G 295	M18
R	AUDIO WARN SYS SUP1		W 371	M21
R	MWS SUP 1		W 252	N21
	SYS2 VAC PUMP SUP & FWD AUTO CONT	2-213	H1123	A16
	SYS2 DISCH VALVE POSN IND		H1129	A17
R	SYS1 VAC PUMP SUP & FWD FAN AUTO CONT		H1127	G17
R	SYS2 PRESSN CONT & SUP		H1159	H15
R	SYS1 PRESSN CONT & SUP		H1122	H16
	SYS1 DISCH VALVE POSN IND		H1128	H17
R R	LH UC WEIGHT SW & DOWNLOCK B SYS SUP	3-213	G 293	B 8
	RH UC WEIGHT SW "B" SYS SUP		G 294	B 9
	AUDIO WARN SYS SUP2	5-213	W 372	C17
R	MWS SUP2		W 251	D15
	SYS1 FWD & AFT DISCHARGE VALVE SUP		H1125	E 8
	CABIN OVER PRESS IND		H1126	E 9
R	SYS1 GRND PRESSN CONT	15-215	H1157	E 3
R	SYS2 GRND PRESSN CONT	15-216	H1158	D23

R (2) On Flight Engineer panel 1-214, make certain that :

R (a) GROUND PRESSURE RELIEF VALVE - SHUT1 - AUTO -
R SHUT2 switch is placed in AUTO position.

R (b) SYSTEM SELECT - SYS1 - SYS2 mechanically
R linked switches are placed in SYS1 position.
R NOTE : In the test procedure described below,

the SYSTEM SELECT switching operation to SYS1 or SYS2 position means that the two mechanically linked switches are placed in the same position.

(c) DISCHARGE VALVES SYS 1 and SYS 2 - FWD SHUT - NORM - AFT SHUT switches are placed in NORM position.

(d) DITCHING SYS 1 - NORM - SHUT switch is placed in NORM position and red safety guard is placed on switch.

(e) DITCHING SYS 2 NORM - SHUT switch is placed in NORM position and red safety guard is placed on switch.

(f) EMERGY DEPRESS - NORM - TEST switch is placed in NORM position and red safety guard is placed on switch.

(3) On centre console, panel 9-211, make certain that throttle control levers are in IDLE position.

(4) Position access platform under the fuselage, open access door 811AZ to gain access to lower baggage compartment access door.

(5) In lower baggage compartment, open access door 131AS.

(6) Open floor panel 243EF located aft of the passenger compartment.

(7) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(8) Start-up the interphone system (Ref. 23-41-00, Adjustment/Test).

(9) RH electronics rack, zone 216.

(a) Open access door 216AS.

(b) Shelf 10-216, on SYS2 amplifier H1156, make certain that FLT-GTST switch is placed in FLT position.

(c) Close access door 216AS.

(10) LH electronics rack, zone 215.

R (a) Open access door 215AS.

R (b) Shelf 10-215, on SYS 1 amplifier H1146, make
R certain that FLT-GTST switch is placed in FLT
R position.

R (c) Close access door 215AS.

R C. Functional Test of Overpressure Indicating System
R (1) On Flight Engineer panel 1-214, hold OVER PRESS
R warning light pressed and check that :

R (a) OVER PRESS warning light is on.

R (b) On panel 4-211, on master warning panel, PRESS
R warning light is on.

R (c) The gong sounds.

R (2) Release OVER PRESS warning light and check that :

R (a) OVER PRESS warning light is no longer on.

R (b) On panel 4-211, on master warning panel, PRESS
R warning light is no longer on.

R (c) The gong stops.

R (3) Trip safety and tag the following circuit breaker :

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R	CABIN OVER PRESS IND	5-213	H1126	E 9

R (4) Gain access to lower baggage compartment and through
R access door 131AS disconnect pressure regulating
R and safety valve H1137 connector H1137A, then shunt
R pins A and B of movable connector H1137A.

R (5) Remove safety clip and tag and set the circuit breaker
R tripped in paragraph 2.C(3) and check that :

R (a) On Flight Engineer panel, OVER PRESS warning
R light is on.

R (b) On panel 4-211, on master warning panel, PRESS
R warning light is on.

(c) The gong sounds.

(6) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
CABIN OVER PRESS IND	5-213	H1126	E 9

(7) Gain access to lower baggage compartment and through access door 131AS.

(a) Remove shunt from pins A and B of movable connector H1137A then connect this connector to the regulating and safety valve H1137.

(b) Disconnect electrical connector H1139A from regulating and safety valve H1139 then shunt pins A and B of movable connector H1139A.

(8) Remove safety clip and tag and set the circuit breaker tripped in paragraph 2.C(6) and check that :

(a) On Flight Engineer panel 1-214, OVER PRESS warning light is on.

(b) On panel 4211, on master warning panel, PRESS warning light is on.

(c) The gong sounds.

(9) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
CABIN OVER PRESS IND	5-213	H1126	E 9

(10) Gain access to lower baggage compartment through access door, then through access door 131AS.

(a) Remove shunt from pins A and B of movable connector H1139A, then connect this connector to pressure regulating and safety valve H1139.

(11) Remove safety clip and tag and set the circuit breaker tripped in paragraph 2.C(9) and check that :

R (a) On Flight Engineer panel, OVER PRESS warning
R light is no longer on.

R (b) On panel 4-211, on master warning panel, PRESS
R warning light is no longer on.

R (c) The gong no longer sounds.

D. Functional Test of Ditching Control

(1) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SYS2 DITCHING VALVE CONT	1-213	H1150	F10
SYS1 DITCHING VALVE CONT		H1149	G13

R (2) Gain access to lower baggage compartment through
R access door 811AZ then through access door 131AS :

R (a) Disconnect electrical connector H1137B from
R pressure regulating and safety valve H1137.

R (b) Disconnect electrical connector H1139B from
R pressure regulating and safety valve H1139.

R (3) Aft of passenger compartment, through floor panel
R 243EF

R (a) Disconnect connector H1138B from regulating
R and safety valve H1138.

R (b) Disconnect electrical connector H1140B from
R regulating and safety valve (H1140).

R (4) Connect to movable connector H1137B.

R (a) The multimeter set to the ohmmeter function
R and check that continuity exists :

R (a1) between pins N and S

R (a2) between pins S and U.

R (b) The multimeter set to the voltmeter function :

R (b1) positive terminal to pin V

(b2) negative terminal to pin L.

(5) On panel 1-213, remove safety clip and tag and set circuit breaker H1149 (Tripped in paragraph D(1)).

(6) On multimeter, check that indicated voltage is 0.

(7) On Flight Engineer panel 1-214, place safety guard on DITCHING SYS1 - NORM - SHUT switch and place switch in SHUT position.

(8) On multimeter, check that indicated voltage is 28VDC.

(9) On Flight Engineer panel 1-214, remove safety guard from DITCHING SYS1 - NORM - SHUT switch which moves to NORM position.

(10) Connect multimeter set to the voltmeter function to movable connector H1137B. Connect :

(a) positive terminal to pin T

(b) negative terminal to pin V.

(11) On multimeter, check that the indicated voltage is 28VDC.

(12) Trip, safety and tag the circuit breaker set in paragraph 2.D(5).

(13) On movable connector H1138B, repeat the same operations as for connector H1137B, paragraph 2.D(4) to 2.D(12).

(14) Connect to movable connector H1139B :

(a) The multimeter set to the ohmmeter function and check that continuity exists between

(a1) pins N and S

(a2) pins S and U.

(b) The multimeter set to the voltmeter function

(b1) positive terminal to pin V

(b2) negative terminal to pin L.

(15) On panel 1-213, remove safety clip and tag and set the

R following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R SYS2 DITCHING VALVE CONT	1-123	H1150	F10

R (16) On multimeter, check that indicated voltage is null.

R R R (17) On Flight Engineer panel 1-214, place safety guard on DITCHING SYS2 - NORM - SHUT switch and place switch in SHUT position.

(18) On multimeter, check that indicated voltage is 28VDC.

R R R (19) On Flight Engineer panel 1-214, remove safety guard from DITCHING SYS2 - NORM - SHUT switch which moves to NORM position.

R R (20) Connect multimeter set to the voltmeter function to movable connector H1139B. Connect :

R (a) positive terminal to pin T

R (b) negative terminal to pin V.

R R (21) On multimeter, check that the indicated voltage is 28VDC.

R R (22) Trip, safety and tag the circuit breaker set in paragraph 2.D(15).

R R R (23) For movable connector H1140B, repeat the operations carried out for connector H1139B, paragraph 2.D(14) to 2.D(22).

R R (24) Aft of passenger compartment, through floor panel 243EF :

R R (a) Disconnect multimeter from movable connector H1140B.

R R (b) Connect connector H1140B to regulating and safety valve H1140.

R R (c) Connect connector H1138B to regulating and safety valve H1138.

R (d) Close floor panel 243EF.

R R (25) From lower baggage compartment and through access door 131AS.

R R (a) Connect connector H1137B to regulating and safety valve H1137.

R R (b) Connect connector H1138B to regulating and safety valve H1138.

R R (c) In lower baggage compartment, close access door 131AS.

R (d) Close lower baggage compartment door 811AZ.

R R (26) Remove safety clips and tags and set the following circuit breakers :

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R	SYS2 DITCHING VALVE CONT	1-213	H1150	F10
R	SYS1 DITCHING VALVE CONT		H1149	G13

R E. Functional Test of DISCHARGE VALVES Indicating System

R R R (1) On Flight Engineer panel 1-124, place DISCHARGE VALVES SYS1 switch in FWD SHUT position and on DISCHARGE VALVES position indicator, check that :

R (a) SYS1 FWD tape indicates SHUT.

R R (b) SYS1 AFT, SYS2 FWD, SYS2 AFT tapes indicate OPEN.

R R R (2) On Flight Engineer panel 1-214, place DISCHARGE VALVES SYS1 switch in AFT SHUT position and on DISCHARGE VALVES position indicator check that :

R (a) SYS1 AFT tape indicates SHUT

R R (b) SYS1 FWD, SYS2 FWD, SYS2 AFT tapes indicate OPEN.

R R R (3) On Flight Engineer panel 1=214, place DISCHARGE VALVES SYS1 in NORM position and on DISCHARGE VALVES position indicator check that :

(a) SYS1 FWD, SYS1 AFT, SYS2 FWD, SYS2 AFT tapes indicate OPEN.

(4) On Flight Engineer panel place DISCHARGE VALVES SYS2 switch in FWD SHUT position and on DISCHARGE VALVES position indicator check that :

(a) SYS2 FWD tape indicates SHUT.

(b) SYS1 FWD, SYS1 AFT, SYS2 AFT indicating tapes are in OPEN position.

(5) On Flight Engineer panel 1-214, place DISCHARGE VALVES SYS2 switch in AFT SHUT position and on DISCHARGE VALVES position indicator, check that :

(a) SYS2 AFT indicating tape is in SHUT position.

(b) SYS1 FWD, SYS1 AFT, SYS2 FWD indicating tapes are in OPEN position.

(6) On Flight Engineer panel 1-214, place DISCHARGE VALVES SYS2 switch in NORM position and on DISCHARGE VALVES position indicator, check that :

(a) SYS1 FWD, SYS1 AFT, SYS2 FWD, SYS2 AFT indicating tapes are in OPEN position.

F. Functional Test of Pressure Regulating System 2

(1) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SYS1 PRESSN CONT & SUP	2-213	H1122	H16

(2) On DISCHARGE VALVES position indicator check that SYS1 FWD and SYS1 AFT indicating tapes are in SHUT position.

(3) On Flight Engineer panel 1-214, place GROUND PRESSURE RELIEF VALVE switch in SHUT1 position and check that :

(a) GROUND PRESSURE RELIEF VALVE magnetic indicator displays stripes then SHUT.

(4) On Flight Engineer panel 1-124.

(a) Place SYSTEM SELECT SYS1 - SYS2 in SYS2 position.

(b) On system 2 pressure regulating selector (on the RH side of panel).

(b1) Position white mark of knurled knob R in line with white mark engraved on the support.

(b2) By means of knurled knob A, display the field altitude.

(b3) By means of knurled knob B, display the local pressure.

(5) On Flight Engineer panel 1-214.

(a) Place safety guard on EMERGY DEPRESS switch and place switch in TEST position; on DISCHARGE VALVES position indicator check that :

(a1) SYS2 FWD indicating tape is in OPEN position

(a2) SYS2 AFT indicating tape indicates that the valve is partially open.

(6) Close all the aircraft doors.

(7) On Flight Engineer Panel 25-214, on door warning panel

(a) Press and hold DOORS TEST pushbutton and check that caption lights indicating that doors are closed come on.

(b) Release DOORS TEST pushbutton the caption lights indicating door closing are no longer on.

(8) Connect cabin pressurization unit and progressively supply pressure.

(9) On Flight Engineer panel 1-214, check that rate of climb indicator stabilizes at 0 (ΔP null).

(10) On Flight Engineer panel 1-214, on system 2 pressure regulating selector, with knob A, select an altitude of -1000 ft with respect to the field altitude. Check that :

(a) The rate of climb indicator indicates approximately 3000 ft /mn.

(b) When differential pressure indicator indicates 0.6-0.8 psi (40-55 mbar) the rate of climb indicator pointer is stabilized.

(11) On Flight Engineer panel 1-214 on system 2 cabin pressure regulating selector, select the field altitude by means of knob A.

(a) Check that differential pressure decreases on cabin differential pressure indicator.

(b) When differentical pressure indicator indicates 0.2 psi (14 mbars), place EMERGY DEPRESS switch in NORM position and check that :

(b1) On DISCHARGE VALVES position indicator

- SYS2 FWD and SYS2 AFT indicating tapes are in OPEN position.
- SYS1 FWD and SYS1 AFT indicating tape are in SHUT position.

(12) On Flight Engineer panel 1-214, place GROUND PRESSURE RELIEF VALVE switch in AUTO position and check that :

(a) GROUND PRESSURE RELIEF VALVE magnetic indicator displays stripes and then OPEN.

(13) On panel 2-213, remove safety clip and tag and set set the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SYS1 PRESSN CONT & SUP	2-213	H1122	H16

(14) On Flight Engineer panel, on DISCHARGE VALVES position indicator, check that :

(a) SYS1 FWD and SYS1 AFT indicating tapes are in OPEN position.

(15) Shut down and disconnect cabin pressurizing unit.

<u>NOTE</u> : This test can be easily carried out by the crew during normal flight.
In this case, place SYSTEM SELECT SYS1-SYS2

R in SYS2 position and make certain that system
R 2 operates by checking instruments on panel
R 1-214.

Test during flight has the advantage of avoiding aircraft set-up on the ground and more-
R over checking the operation of the constant
R differential pressure limitation (10.7 PSI 738 mbar).

G. Functional Test of Cabin Quick Depressurization System and
R Landing Gear Relays

R <u>NOTE</u> : The aircraft is in ground configuration.

R (1) On Flight Engineer panel 1-214, on DISCHARGE VALVES
R position indicator check that :

R (a) SYS1 FWD, SYS1 AFT, SYS2 FWD, SYS2 AFT indicating
R tapes are in OPEN position.

R (2) On Flight Engineer panel 1-214 :

R (a) Place EMERGY DEPRESS-NORM-TEST switch in EMERGY
R DEPRESS position and check that :

R (a1) On DISCHARGE VALVES position indicator,
R SYS1 FWD, SYS1 AFT, SYS2 FWD, SYS2 AFT
R indicating tapes are in OPEN position.

R (b) Place EMERGY DEPRESS-NORM-TEST switch in NORM
R position and check that :

R (b1) On DISCHARGE VALVES position indicator
R SYS1 FWD, SYS1 AFT, SYS2 FWD, SYS2 AFT
R indicating tapes are in OPEN position.

R (3) On Flight Engineer panel 1-214

R (a) Place SYSTEM SELECT SYS1 - SYS2 switch in SYS1
R position and check that :

R (a1) On DISCHARGE VALVES position indicator the
R four indicating tapes are in OPEN position.

R (4) On Flight Engineer panel 1-214, on system 1 automatic
R pressure regulating selector (located on the panel
R LH side)

R (a) By means of knob A, select an altitude of
R -5000 ft with respect to the field altitude.

R R (5) On panel 1-213, trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH U/C WEIGHT SW A SYS SUP	1-213	G 292	M17

R R Check that :

R R R (a) On Flight Engineer panel 1-214, on DISCHARGE VALVES position indicator, the four tapes are in SHUT position.

R R R (6) On Flight Engineer panel 1-214, place EMERGY DEPRESS-NORM-TEST switch in EMERGY DEPRESS position and on DISCHARGE VALVES position indicator. Check that :

R R (a) SYS1 FWD and SYS1 AFT indicating tapes are in SHUT position.

R R (b) SYS2 FWD and SYS2 AFT indicating tapes are in OPEN position.

R R R (7) On Flight Engineer panel 1-214, place EMERGY DEPRESS-NORM-TEST switch in NORM position and on DISCHARGE VALVES position indicator. Check that :

R (a) The four tapes are in SHUT position.

R R R (8) On panel 1-213, remove safety clip and tag and set the circuit breaker tripped in paragraph 2.G(5). Check that :

R R R (a) On Flight Engineer panel 1-214, on DISCHARGE VALVES position indicator, the four indicating tapes are in OPEN position.

R R R (9) On Flight Engineer panel 1-214, on system 2 automatic pressure regulating selector (located on the panel RH side)

R R (a) By means of knob A, select an altitude of -5000 ft with respect to the field altitude.

R (10) Trip, safety and tag the following circuit breaker :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RH U/C WEIGHT SW & DOWNLOCK A SYS SUP	1-213	G295	M18

Check that :

(a) On Flight Engineer panel 1-214, on DISCHARGE VALVES position indicator, the four tapes are in SHUT position.

(11) On panel 1-213, remove safety clip and tag and set circuit breaker G295 tripped in paragraph 2.G(10) and check that :

(a) On Flight Engineer panel 1-214, on DISCHARGE VALVES position indicator, the four tapes are in OPEN position.

(12) On Flight Engineer panel 1-214, on system 1 and system 2 automatic pressure regulating selectors, by means of knob A, select the field altitude.

H. Test of Throttle Control Lever Microswitches

(1) On center console 9-211, place throttle control lever 1 in MAX THRUST position, and check that :

(a) On Flight Engineer panel 1-214,

(a1) On DISCHARGE VALVES position indicator, the four tapes are in SHUT position.

(a2) GROUND PRESSURE RELIEF VALVE magnetic indicator displays stripes then SHUT.

(2) On center pedestal 9-211, place throttle control lever 1 in idle position and check that :

(a) On Flight Engineer panel 1-214 :

(a1) On DISCHARGE VALVES position indicator the four tapes are in OPEN position.

(a2) GROUND PRESSURE RELIEF VALVE magnetic indicator displays stripes then OPEN.

(3) Repeat the operations described in 2.H(1) and 2.H(2)

R with throttle control levers 2, 3, 4.

R (a) The results must be identical.

R I. Opening Test of Cabin Pressure Variation Rate System

R (1) Trip, safety and tag the following circuit breakers :

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R	LH/UC WEIGHT SW A SYS SUP	1-213	G292	M17
R	SYS2 PRESSN CONT & SUP	2-213	H1159	H15
R	SYS2 GRND PRESSN CONT	15-216	H1158	D23

R (2) RH electronics rack zone 216.

R R (a) Open access door 216AS to gain access to shelf 10-216.

R R (b) Remove SYS2 amplifier (H1156) (Ref. 21-35-43, Removal/Installation).

R R R R (c) On shelf 10-216, connect multimeter set to the ohmmeter function to connector H1156A between pins 41 and 42 and check that continuity exists between the two pins :

R R (3) Remove safety clip and tag and set circuit breaker H1158 tripped in paragraph 2.I(1).

R R R (4) On Flight Engineer panel 1-214, place EMERGY DEPRESS-NORM-TEST switch in EMERGY DEPRESS position; on multimeter, check that :

R R (a) There is no longer continuity between pins 41 and 42.

R R R (5) On Flight Engineer panel 1-214, place EMERGY DEPRESS-NORM-TEST switch in NORM position and on multimeter check that :

R (a) There is continuity between pins 41 and 42.

R R (6) On panel 15-216, trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R SYS2 GRND PRESSN CONT	15-216	H1158	D23

R (7) On RH electronics rack zone 216 :

R (a) On shelf 10-216, disconnect multimeter from
R connector H1156A.

R (b) Install SYS2 amplifier H1156 (Ref. 21-35-43,
R Removal/Installation).

R (c) Install access door 216AS.

R (8) Remove safety clips and tags and set the following
R circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R LH U/C WEIGHT SW A SYS SUP	1-213	G292	H17
R SYS2 PRESSN CONT & SUP	2-213	H1159	H15
R SYS2 GRND PRESSN CONT	15-216	H1158	D23

R (9) On Flight Engineer panel 1-214, on DISCHARGE VALVES
R position indicator, the four indicating tapes are in
R OPEN position.

R J. Functional Test of EXCESS ALT Indicating System

R (1) On Flight Engineer panel 1-214, press and hold EXCESS
R ALT warning light.

R (a) EXCESS ALT warning light comes on.

R (b) On panel 4-211, on master warning panel, PRESS
R warning light comes on.

R (c) The gong sounds.

R (2) On Flight Engineer panel 1-214, release EXCESS ALT
R warning light.

R (a) EXCESS ALT warning light is no longer on.

R (b) On panel 4-211, on master warning panel, PRESS
R warning light comes on.

R (c) The gong stops.

R (3) Shut down the electrical ground power unit; do not
R disconnect at this stage (Ref. 24-41-00, Servicing).

R WARNING : FOR SAFETY PURPOSES AND IN ORDER TO TAKE
R ALL THE SAFETY PRECAUTIONS AGAINST UNTIMELY
R OPERATIONS, DISPLAY A WARNING NOTICE ON
R THE ELECTRICAL GROUND POWER UNIT PROHIBITING
R ENERGIZATION OF THE AIRCRAFT ELECTRICAL
R NETWORK.

R (4) On Flight Engineer panel 6-214, make certain that
R Battery A and B switches are in OFF position.

R WARNING : FOR SAFETY PURPOSES AND IN ORDER TO TAKE
R ALL THE SAFETY PRECAUTIONS AGAINST UNTIMELY
R OPERATIONS, DISPLAY A WARNING NOTICE ON
R PANEL 6-214 PROHIBITING OPERATION OF BATTERY
R SWITCHES A and B.

R (5) On Flight Engineer panel 3-214, open HYDRAULIC
R MANAGEMENT panel.

R (6) Using adaptor D921625001, connect pressure generator
R to altitude switch H1103 test connector.

R (7) Remove warning notices, connect electrical ground
R power unit and energize the aircraft electrical
R network (Ref. 24-41-00, Servicing).

R WARNING : 115 VOLTS ON ALL THE LOWER SECTION OF PANEL
R (ZONE ELECTRICAL GENERATING CONTROL).

R (8) By means of pressure generator, slowly display a
R static pressure of 697 +13, -0 mbar (10 + 0.29,
R -0 psi corresponding to an altitude of 10000 +0,
R -500 ft and check that :

R (a) On Flight Engineer panel 1-214, EXCESS ALT
R warning light comes on.

R (b) On panel 4-211, on master warning panel, PRESS
R warning light comes on.

R (c) The gong sounds.

R R (9) On pressure generator, slowly decrease pressure; check that :

R R (a) On Flight Engineer panel 1-214, EXCESS ALT warning light is no longer on.

R R (b) On panel 4-211, on master warning panel, PRESS warning light is no longer on.

R (c) The gong stops.

R K. Close-Up

R R R (1) De-energize the aircraft electrical network and disconnect the electrical ground power unit (Ref. 24-41-00, Servicing).

R R (2) Disconnect pressure generator from altitude switch test connector.

R R (3) Disconnect adaptor D921625001 from test line and remove pressure generator.

R R (4) On Flight Engineer panel 3-214, close HYDRAULIC MANAGEMENT panel.

R (5) On Flight Engineer panel 1-214 :

R R (a) Place EMERGY DEPRESS-NORM-TEST in NORM position and place safety guard on switch.

R R (b) Place DITCHING SYS1 NORM-SHUT switch in NORM position; place safety guard on switch.

R R (c) Place DITCHING SYS2 NORM-SHUT switch in NORM position; place safety guard on switch.

R (6) Remove access platform.

END OF THIS SECTION

NEXT

VACUUM PUMP - REMOVAL/INSTALLATION

1. General

B A forward pump may be fitted in the rear position if required.

R 2. Forward Vacuum Pump

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clip	
R Access Platform 3.22 m (10.7 ft.)	

B. Prepare

R (1) Position access platform under the fuselage ; open door
R 811AZ to gain access to the lower baggage compartment.

R (2) In lower bagagge compartment, open access door 131AS
R to gain access to :

R (a) System 1 vacuum pump (H1141) in zone 125.

R (b) System 2 vacuum pump (H1143) in zone 126.

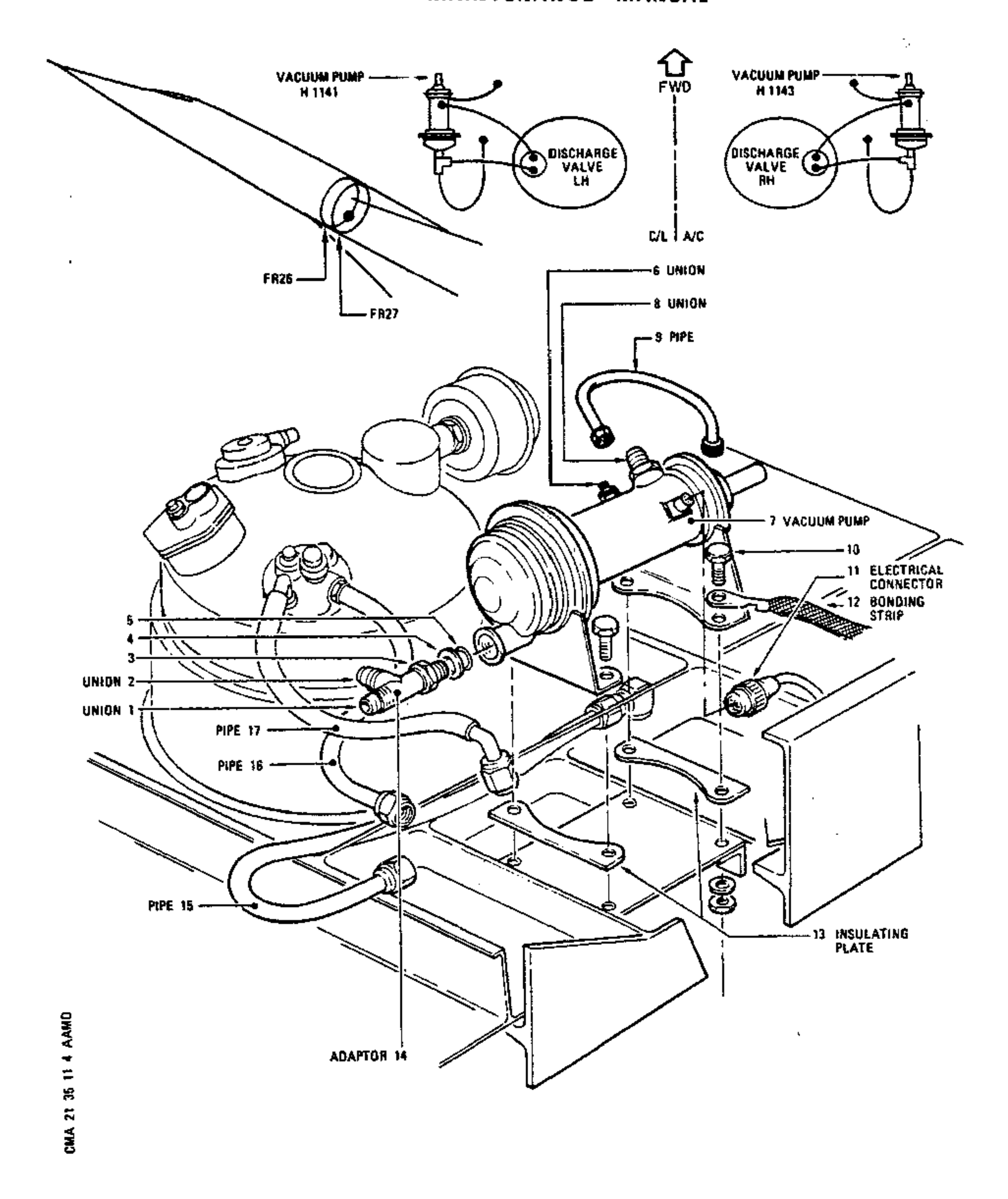
R (3) Trip, safety and tag the following circuit breakers :

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R	SYST1 VAC PUMP SUP & FWD FAN AUTO CONT	2-213	H1127	G17
R	SYST2 VAC PUMP SUP & FWD FAN AUTO CONT	2-213	H1123	A16

R C. Remove (Ref. Fig. 401)

R (1) Disconnect electrical connector (11)

R (2) Disconnect from adaptor (14) :



R Removal/Installation of Forward Vacuum Pump
Figure 401

R (a) pipe (15)

R (b) pipe (16)

R (3) Disconnect pipe (9) from union (6).

R (4) Disconnect pipe (17) from union (8).

R (5) Remove nuts and bolts (10) and washers, then remove
R bonding strip (12).

R (6) Remove vacuum pump (7), insulating plates (13).

R (7) On removed vacuum pump.

R (a) Remove nut (3)

R (b)Remove adaptor (14), washer (4), seal (5).

R D. Preparation of Replacement Component

R (1) Install a new seal (5) on adaptor (14).

R (2) Install washer (4).

R (3) Install adaptor (14) in correct position.

R (4) Install nut (3).

R E. Install (Ref. Fig. 401)

R (1) Install insulating plates (13).

R (2) Install vacuum pump (7).

R (3) Install bonding strip (12) bolts (10) washers and nuts.

R (4) Install a new seal on each adaptor and connect :

R (a) pipe (9) to union (6)

R (b) pipe (17) to union (8)

R (c) pipe (16) to union (2)

R (d) pipe (15) to union (1)

R (5) Connect electrical connector (11).

R F. Test

(1) Remove safety clips and tags and set the circuit breakers tripped in paragraph 2-B-(3).

(2) Perform test described in 21-35-11, Adjustment/Test.

G. Close-Up

(1) In lower baggage compartment, close access door 131AS.

(2) Under the fuselage close baggage compartment access door and remove access platform.

3. Aft Vacuum Pumps

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit breaker safety clips	

B. Prepare

(1) Open floor panel 243EF located aft of passenger compartment to gain access to :

(a) system 1 vacuum pump H1142 in zone 167

(b) system 2 vacuum pump H1144 in zone 168.

(2) Trip safety and tag the following circuit breakers :

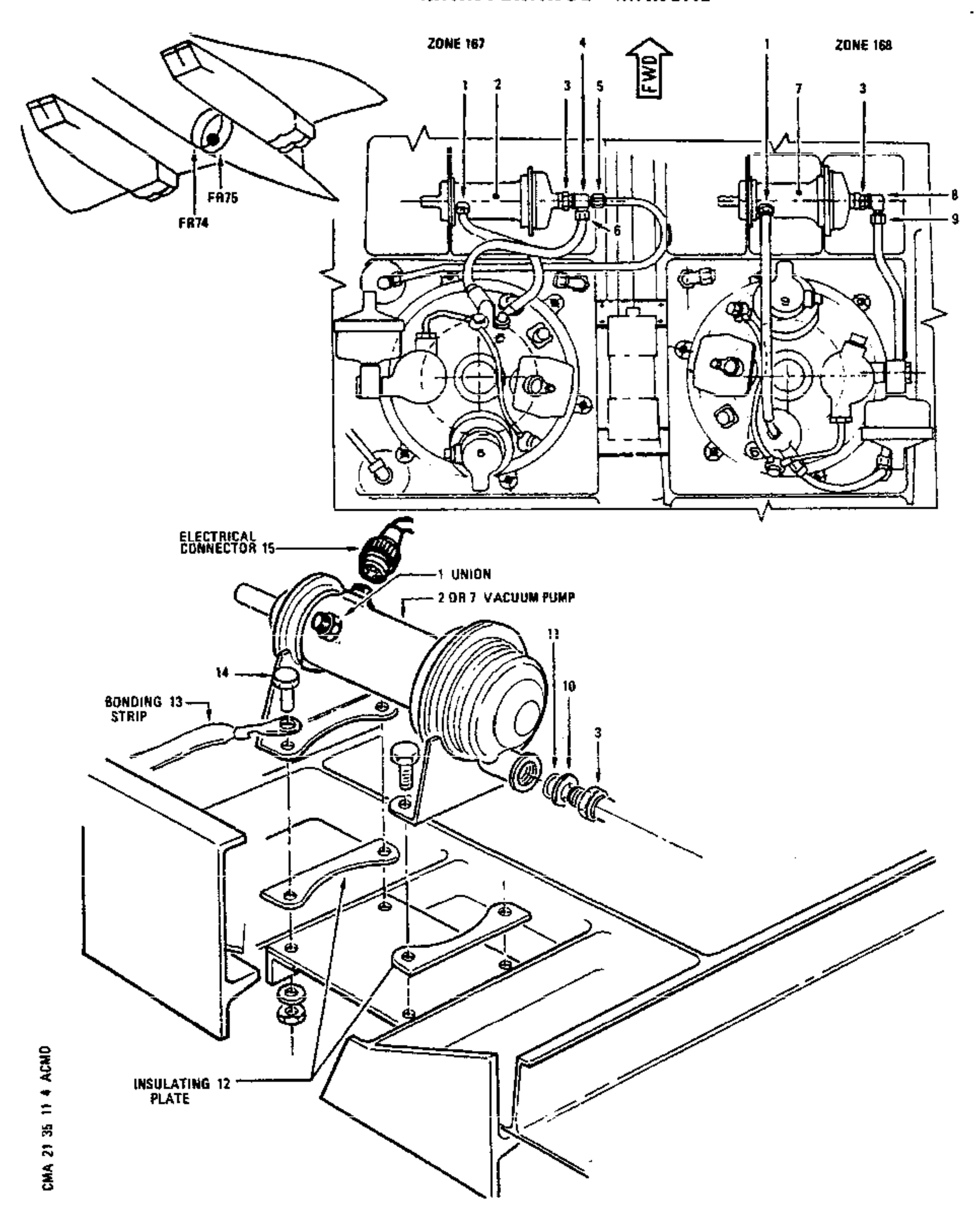
SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SYS1 VAC PUMP SUP & FWD FAN AUTO CONT	2.213	H1127	G17
SYS2 VAC PUMP SUP & FWD FAN AUTO CONT	2.213	H1123	A16

C. Removal (Ref. Fig. 402)

(1) Disconnect electrical connector (15).

(2) Disconnect :

(a) For vacuum pump (2)
- pipes from unions (1), (5) and (6).



Removal/Installation of Aft Vacuum Pumps
Figure 402

R

R (b) For vacuum pump (7)
R - pipes from unions (1) and (9)

R (3) Remove bolts (14) nuts and washers then remove bonding strip (13).

R (4) Remove vacuum pump (2 or 7) and insulating plates (12).

R (5) On removed vacuum pump

R (a) For vacuum pump (2)

R (a1) remove nut (3)

R (a2) remove adaptor (4), washer (10) and seal (11).

R (b) For vacuum pump (7)

R (b1) remove nut (3)

R (b2) remove union (8), washer (10), seal (11).

R D. Preparation of Replacement Component

R B NOTE : A forward pump may be fitted in the aft position if required.

R (1) Install a new seal (11) on union (8) or union (4).

R (2) Install washer (10).

R (3) Install union (4) on vacuum pump (2) or union (8) on vacuum pump (7) :

R B NOTE : If a forward pump is used in the AFT position union (Ref. Fig. 401) (Item 6) is not used and union aperture is left open (not blanked).

R (4) Tighten nut (3).

R E. Install (Ref. Fig. 402)

R (1) Install insulating plates (12).

R (2) Install vacuum pump (2 or 7).

R (3) Install bonding strip (13), bolts (14) washers and nuts.

R (4) Install a new seal on each union and connect :

R (a) For vacuum pump (2)
R -pipes to unions (1), (5) and (6).

R (b) For vacuum pump (7)
R - pipes to unions (1) and (9).

R (5) Connect electrical connector (15).

R After SB 21 041 For A/C 001-007,

R C. Remove (Ref. Fig. 403)

R (1) Disconnect electrical connector (15).

R (2) Disconnect :

R (a) For vacuum pump (3)
R - pipes from unions (1), (2), (6) and (7)

R (b) For vacuum pump (8)
R - pipes from unions (1), (2) and (6)

R (3) Remove bolts (14), nuts and washers, remove bonding
R strip (13).

R (4) Remove vacuum pump (3 or 8) and insulating plates
R (12).

R (5) On removed vacuum pump.

R (a) For vacuum pump (3)

R (a1) remove nut (4)

R (a2) remove adaptor (5), washer (10), seal (11)

R (b) For vacuum pump (8) :

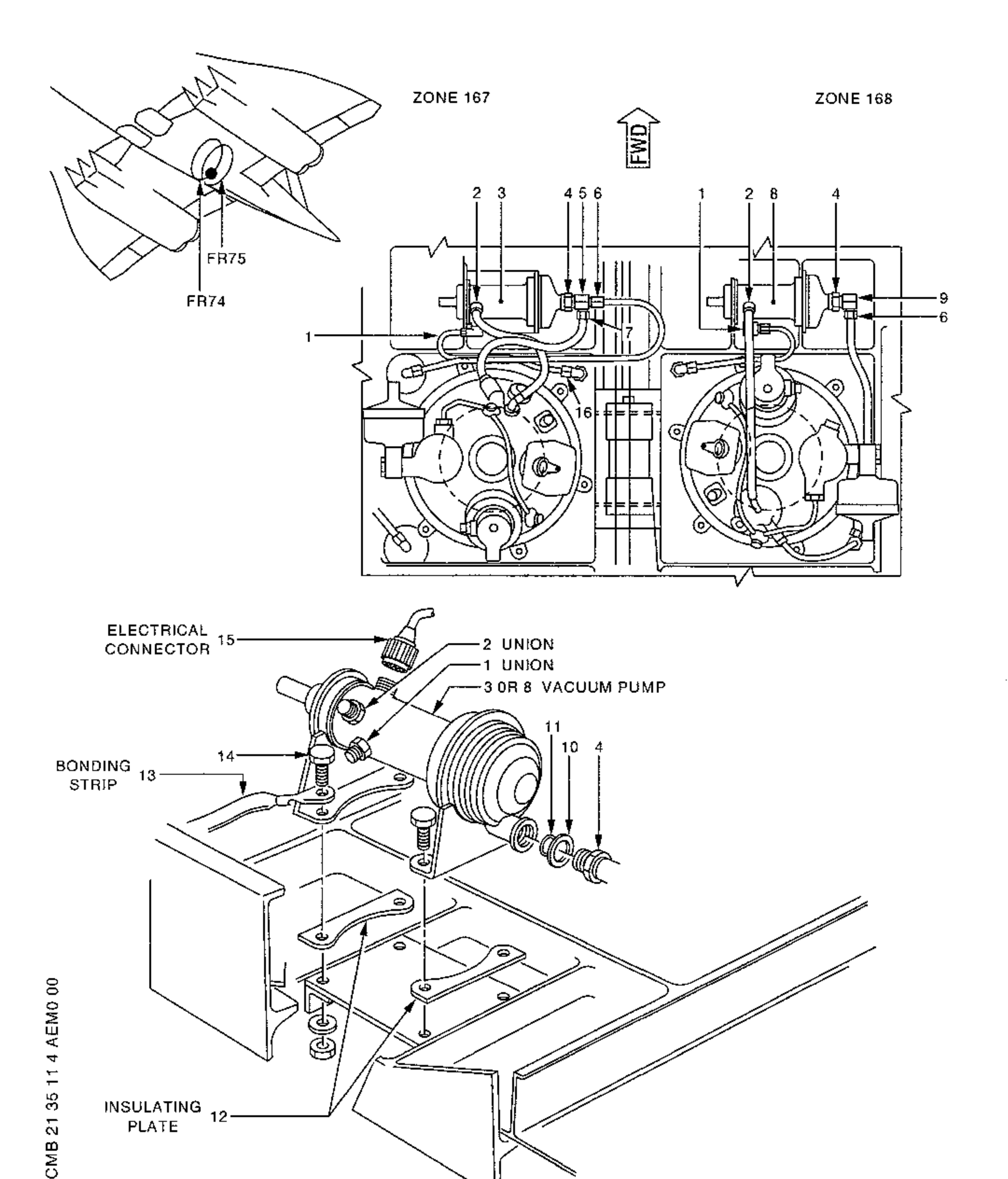
R (b1) remove nut (4)

R (b2) remove union (9), washer (10), seal (11).

R D. Preparation of Replacement Component

R (1) Install washer (10) and new seal (11) on union (9) or
R adaptor (5).

R (2) Install adaptor (5) on vacuum pump (3) or union (9)



Removal/Installation of Aft Vacuum Pumps
Figure 403

R on vacuum pump (8).

R (3) Install nut (4).

R E. Install (Ref. Fig. 403)

R (1) Install insulating plates (12).

R (2) Install vacuum pump (3 or 8).

R (3) Install bonding strip (13), bolts (14) washers
R and nuts.

R (4) Install a new seal on each union and connect :

R (a) For vacuum pump (3)
R - pipes to unions (1), (2), (6) and (7)

R (b) For vacuum pump (8)
R - pipes to unions (1), (2) and (6)

R (5) Connect electrical connector (15).

R F. Tests

R (1) Remove safety clips and tags and set the circuit
R breakers tripped in 3-B-(2).

R (2) Perform the test described in 21-35-11, Adjustment/
R Test.

R G. Close-Up

R (1) Close floor panel 243EF located aft of passenger
R compartment.

VACUUM PUMP - ADJUSTMENT/TEST

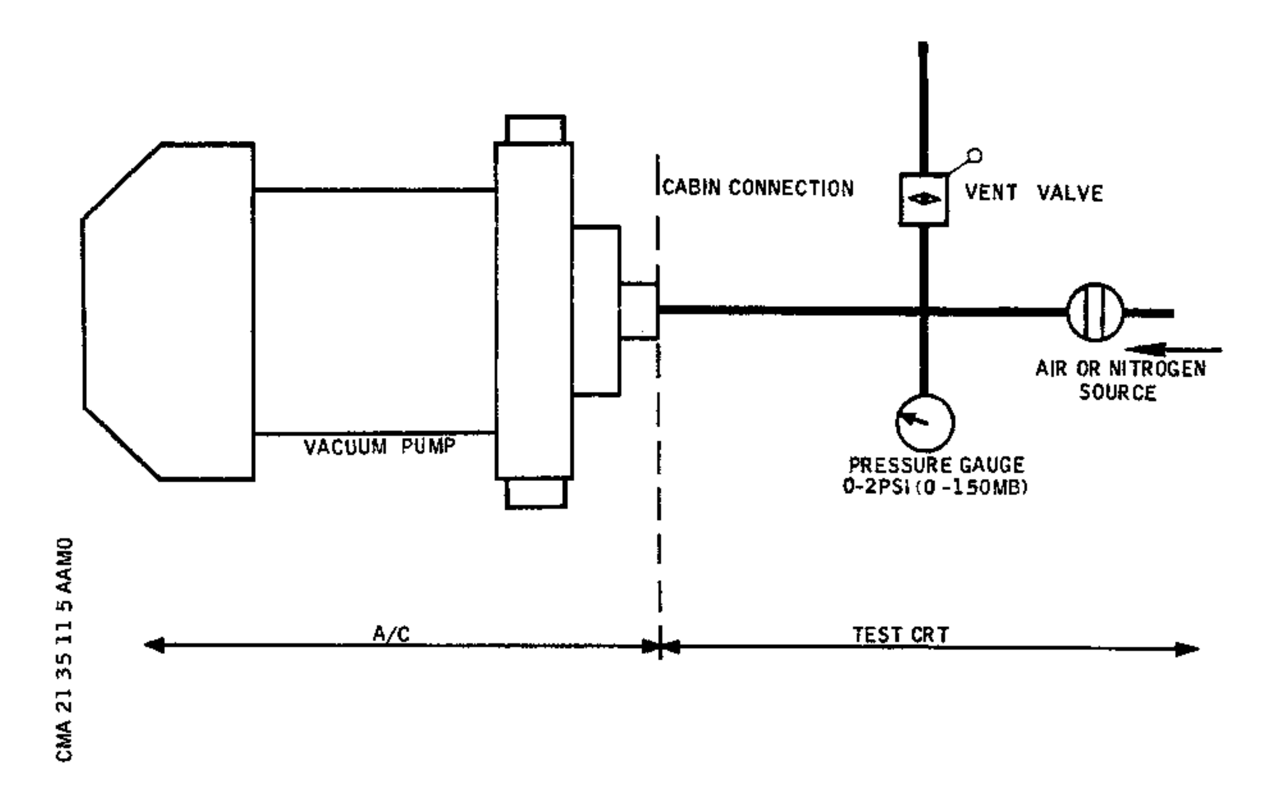
1. General

The test procedure is identical for the four vacuum pumps.

2. Vacuum Pump

A. Equipment and Materials (Ref. Fig. 501)

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Dry Compressed Air (or Nitrogen) Supply Unit Capable of Supplying a Pressure of 1 Bar (15 p.s.i.); No Airflow	
Pressure Reducing Valve: 0 - 150 mbars (0 - 2 p.s.i.)	
Test Equipment According to the Figure Shown Below	



Test Equipment
Figure 501

B. Prepare

(1) To test forward vacuum pumps, open cargo compartment
R access door 811.
R Remove access door 131AS.

(2) To test aft vacuum pumps, open access door : 243EF.

(3) Connect electrical ground power unit and energize the
R aircraft electrical network (Ref. 24-41-00, Servicing).

(4) Connect test equipment to CABIN connector of vacuum pump to be tested.

C. Test

(1) The fan must operate as soon as the aircraft network is energized.

(2) Using the test equipment, increase the pressure to

RB 2.3 psig; The fan should stop. (In fact the Fan
RB continues to turn by inertia, but the operating noise
RB diminishes as soon as the pressure reaches
RB 2 ± 0.3 psig).

B NOTE : When a forward pump is used in the aft position
B the aft installation test does not apply , i.e.
B aft fan will continue to run until power is
B removed.

(3) Slowly relieve pressure ; the fan should operate again.

(4) Depressurize to zero and de-energize the aircraft electrical network.

D. Close-Up

(1) Disconnect electrical ground power unit.

(2) Disconnect test equipment.

(3) Close access doors.

REGULATING AND SAFETY VALVE - REMOVAL/INSTALLATION

1. General

   A. Removal for replacement or inspection.
   Four pressure regulating and safety valves are installed on aircraft.
   - Two at the forward part between FR26 and 27 (Zone 125-126)
   - Two at the aft part between FR74 and 75 (Zone 167-168).

RB B. Valve, P/N 2326A4000, Post SB 21.063, does not have a cabin
RB pressure connection for pipe No.12 FIG 401.

RB It can be fitted in either of the rear positions.

RB If it is required to fit one in a forward position.

RB (1) Blank pipe No.12 with a 1/4 in solid rivet PN SP85-808 or SP80-808 or any 1/4 in bolt, retain with existing hose clip.

RB (2) Bend blanked pipe end back to its fixed end and tape together.

RB (3) Tag pipe with red dymo label printed "connect to D.V. PN 2344A000".

2. Forward Regulating and Safety Valve

   A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 3.22 m (10.7 ft.)	
Circuit Breaker Safety Clips	

   B. Prepare

   (1) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
System 1			
SYS 1 DITCHING VALVE CONT	1-213	H1149	G13
SYS 1 VAC PUMP SUP & FWD FAN AUTO CONT	2-213	H1127	G17

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SYS 1 PRESSN CONT & SUP		H1122	H16
SYS 1 DISCH VALVE POSN IND		H1128	H17
SYS 1 FWD & AFT DISCHARGE VALVE SUP	5-213	H1125	E 8
CABIN OVER PRESS IND		H1126	E 9
SYS 1 GRND PRESSN CONT	15-215	H1157	E 3
System 2 SYS 2 FWD & AFT DISCHARGE VALVE SUP	1-213	H1124	E13
SYS 2 DITCHING VALVE CONT		H1150	F10
SYS 2 VAC PUMP SUP & FWD AUTO CONT	2-213	H1123	A16
SYS 2 DISCH VALVE POSN IND		H1129	A17
SYS 2 PRESSN CONT & SUP		H1159	H15
CABIN OVER PRESS IND	5-213	H1126	E 9
SYS 2 GRND PRESSN CONT	15-216	H1158	D23

(2) Position access platform under the fuselage. Open baggage compartment access door 811AZ.

(3) In lower baggage compartment, open access door 131AS to gain access to:

(a) System 1 regulating and safety valve (H1137) in zone 125.

(b) System 2 regulating and safety valve (H1139) in zone 126.

C. Remove
(Ref. Fig. 401)

(1) Remove clamps and disconnect pipes (6), (11) and (12) from valve.

(2) Remove bonding strip (14).

(3) Remove screws (2). Remove the two half-shells (1) and (3).

(4) Remove pipes (7), (9) and (16) from valve.

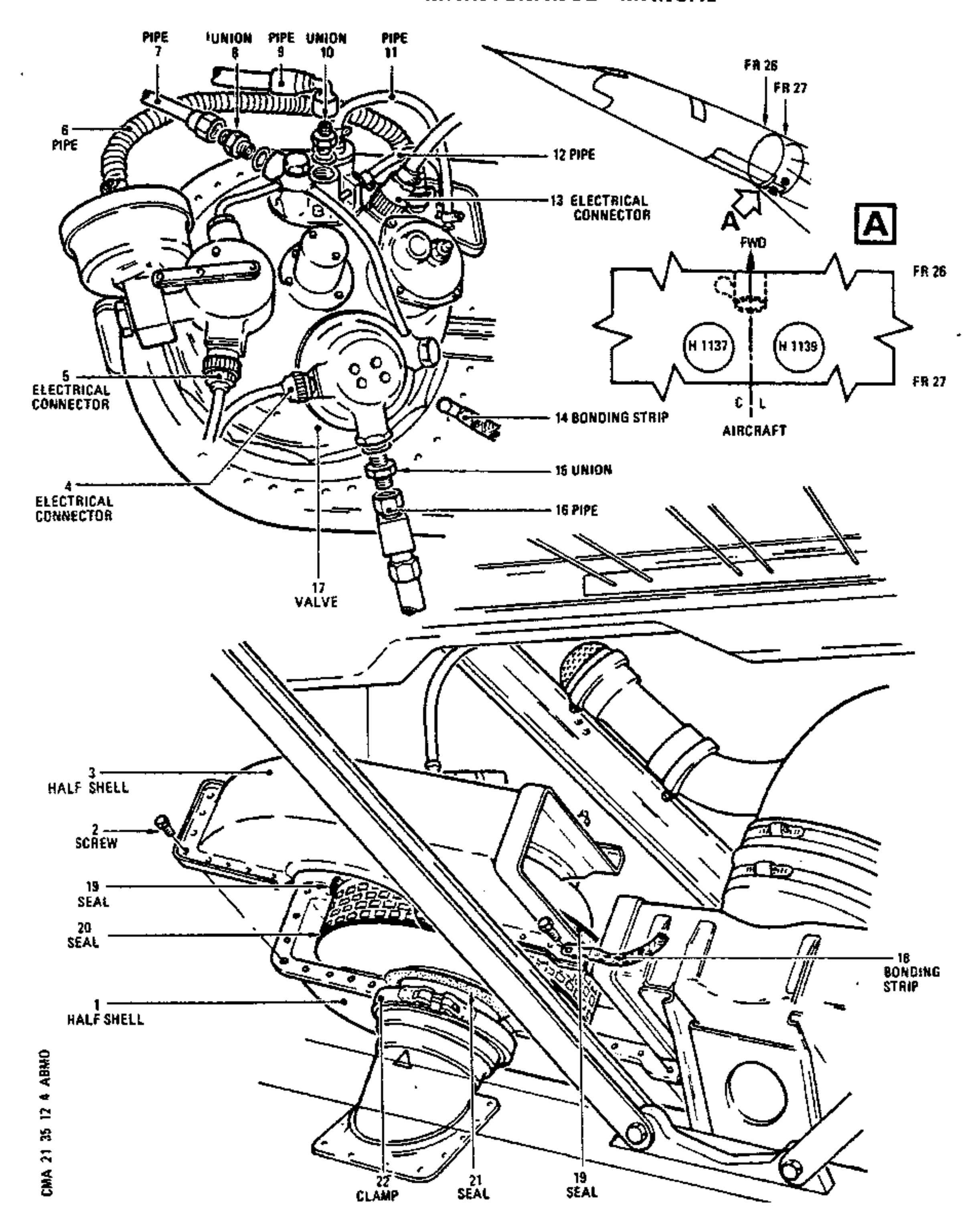
(5) Disconnect electrical connectors (4) (5) and (13) from valve.

(6) Remove clamp (22) and valve (17).

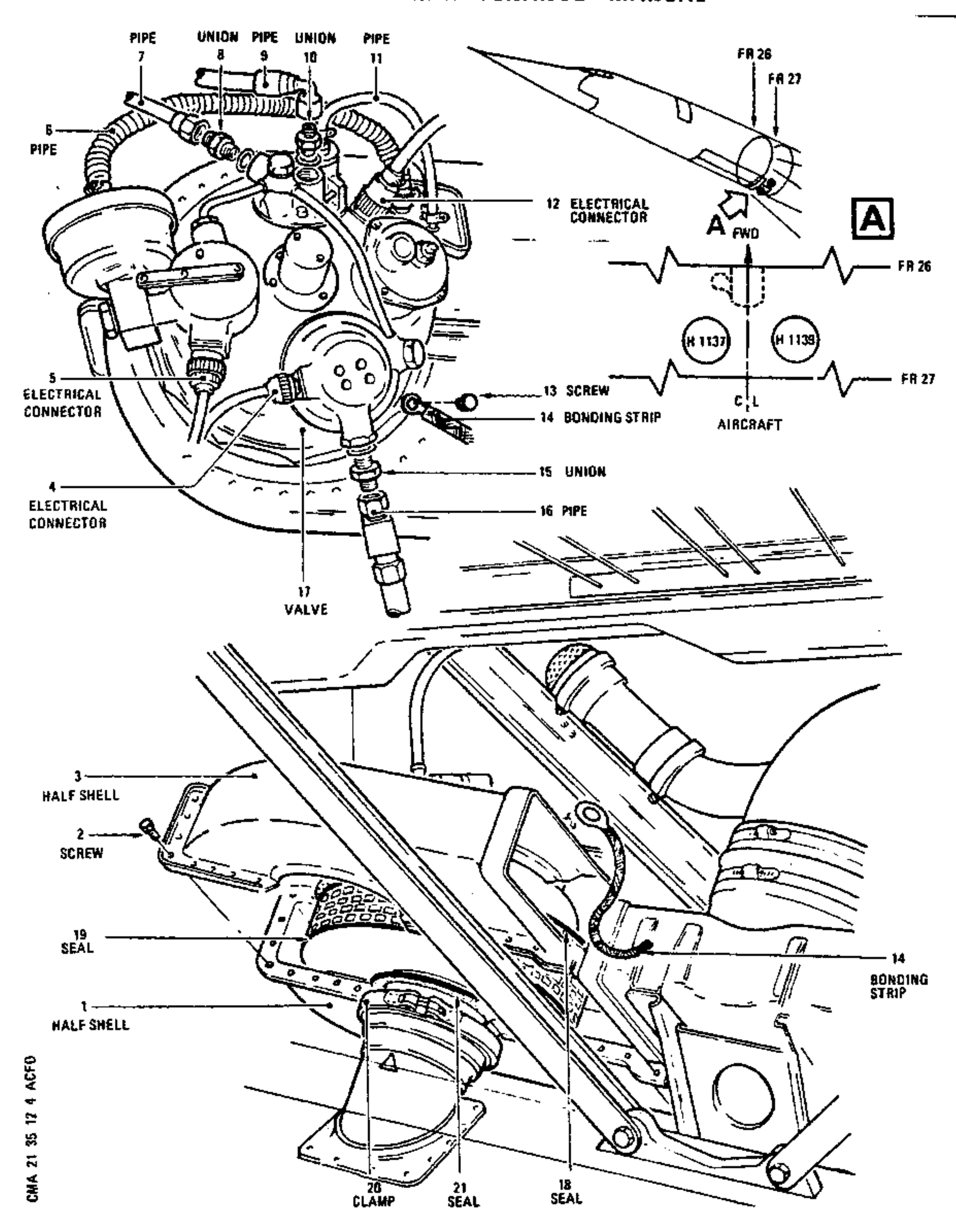
After SB 21-063 For A/C 001-007,

(Ref. Fig. 402).

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R Forward Regulating and Safety Valve
Figure 401



Removal/Installation of Forward
Regulating and Safety Valve
Figure 402

R

R (1) Remove from regulating and safety valve (17) :

R (a) clamps and disconnect pipes (6) and (11)

R (b) screw (13) and remove bonding strip (14)

R (2) Remove screw (13) ; remove the two half-shells (1)
R and (3).

R (3) Disconnect from regulating and safety valve (17) :

R (a) pipes (7), (9) and (16)

R (b) electrical connectors (4), (5) and (12)

R (4) Remove clamp (20), then remove valve (17).

R D. Preparation of Replacement Component

R (1) On removed valve :

R (a) Remove unions (8), (10) and (15) and associated
R seals.

R (2) On new valve :

R (a) Install a new seal on each union (8), (10) and
R (15)

R (b) Install unions (8) and (10) on valve and tighten

R (c) Install union (15) on valve and tighten ; torque
R to between 145 and 155 lbf. in. (1.64 and
R 1.75 mdaN)

R (d) Install a new seal (21) at the base of valve.

R E. Install
R (Ref. Fig. 401)

(1) Install valve (17) equipped with a new seal (identification triangles must coincide).

(2) Secure valve on duct using clamp (22).

(3) Install pipes (7) (9) and (16) and tighten.

(4) Install pipes (6) (11) (12) and tighten clamps.

(5) Install bonding strip (14).

(6) Install electrical connectors (4) (5) and (13).

(7) Make certain that seals (19) and (20) are correctly installed on valve.

(8) Install the two air inlet duct half-shells (1) and (3). Secure with screw (2).

R After SB 21-063 For A/C 001-007,

R (Ref. Fig. 402)

R (1) Install valve (17) on air inlet duct (identification
R triangles must coincide).

R (2) Make certain that seals (19) and (18) are correctly
R installed on valve (17).

R (3) Install clamp (20).

R (4) Connect to valve :

R (a) pipes (7), (9) and (16) and tighten.

R (b) pipes (6) and (11) ; tighten clamps.

R (c) electrical connectors (4), (5) and (12).

R (5) Install bonding strip (14) ; secure with screw (13).

R (6) Install the two air inlet duct half-shells (1) and (3);
R secure with screws (2).

R F. Test

R (1) Remove safety clips and tags and set the circuit brea-
R kers tripped in 2-B-(1).

B (2) Carry out an operational Test (Ref. Adjustment/Test).

R G. Close-Up

R (1) In lower baggage compartment, close access door 131AS.

R (2) Under the fuselage, close baggage compartment access
R door 811AZ and remove access platform.

R 3. Aft Regulating and Safety Valves

R A. Equipment and Materials

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DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	

B. Prepare

(1) Remove safety clips and tags and set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
System 1			
SYS 1 DITCHING VALVE CONT	1-213	H1149	G13
SYS 1 VAC PUMP SUP & FWD FAN AUTO CONT	2-213	H1127	G17
SYS 1 PRESSN CONT & SUP		H1122	H16
SYS 1 DISCH VALVE POSN IND		H1128	H17
SYS 1 FWD & AFT DISCHARGE VALVE SUP	5-213	H1125	E 8
CABIN OVER PRESS IND		H1126	E 9
SYS 1 GRND PRESSN CONT	15-215	H1157	E 3
System 2			
SYS 2 FWD & AFT DISCHARGE VALVE SUP	1-213	H1124	E13
SYS 2 DITCHING VALVE CONT		H1150	F10
SYS 2 VAC PUMP & FWD AUTO CONT	2-213	H1123	A16
SYS 2 DISCH VALVE POSN IND		H1129	A17
SYS 2 PRESSN CONT & SUP		H1159	H15
CABIN OVER PRESS IND	5-213	H1126	E 9
SYS 2 GRND PRESSN CONT	15-216	H1158	D23

(2) Open floor panel 243EF located aft of passenger compartment to gain access to :

(a) System 1 regulating and safety valve (H1138), zone 167.

(b) System 2 regulating and safety valve (H1140), zone 168.

C. Remove
(Ref. Fig. 403)

(1) Remove cotter pins, nuts and bolts securing floor cross beam located above the valve to be removed; remove crossbeam (1).

(2) Disconnect electrical connectors (4) and (9).

(3) Remove pipes (13) (2) and (6) from valve.

(4) Remove bonding strip (12).

(5) Remove screws (7).

(6) Remove valve (11) and washers (8).

D. Preparation of Replacement Component

(1) On removed valve

(a) remove unions (14), (3) and (5) and seals

(2) On new valve

(a) install a new seal on each union (14), (3) and (5)

(b) install unions (14), (3) and (5) on valve and tighten

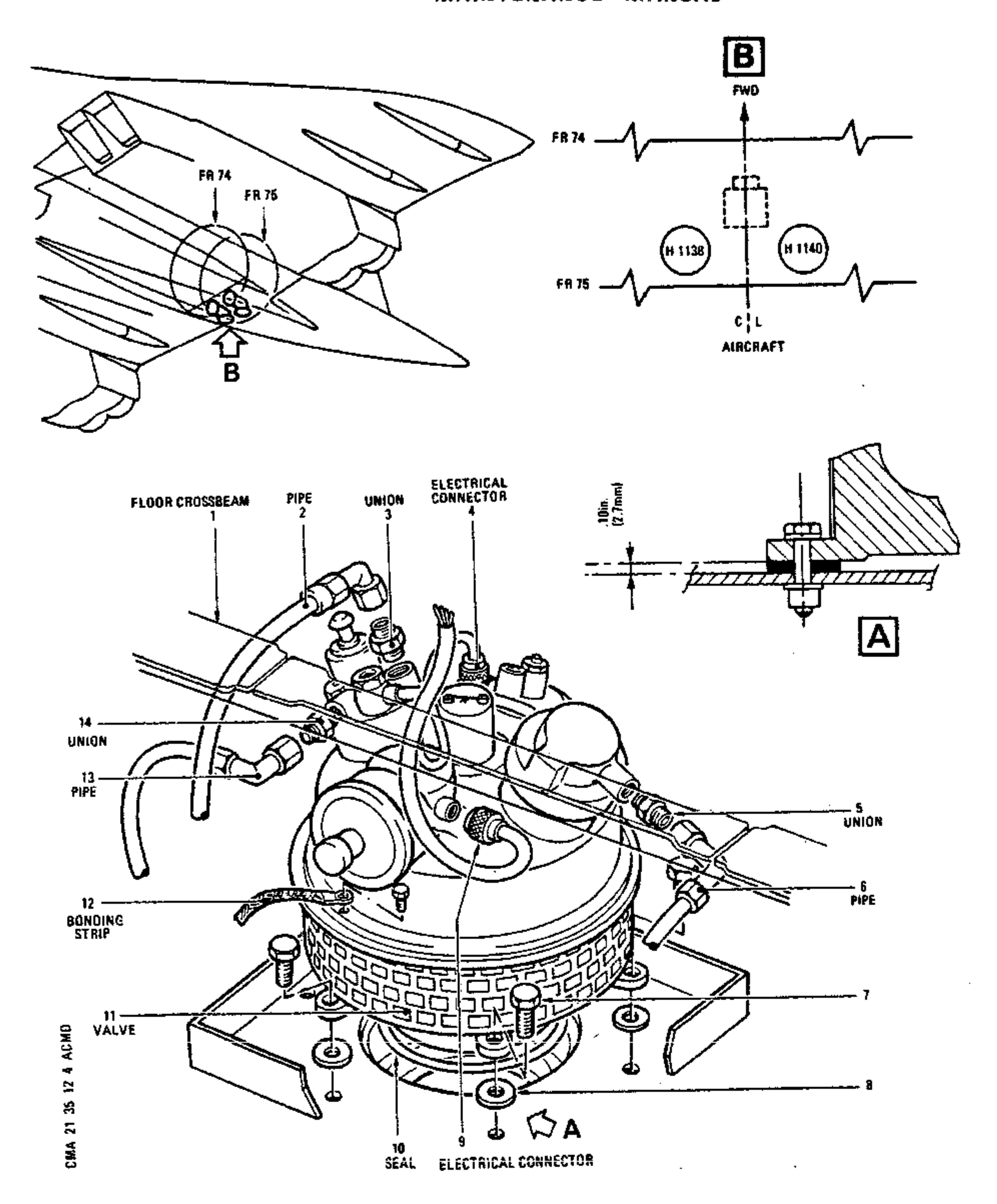
(c) remove and replace seal (10) located at valve base

E. Install
(Ref. Fig. 403)

(1) Install valve (11).

(2) Install new washers (8) and screws (7).

(3) Tighten screws (7). Compress washer (8) to achieve 0.10 inch (2.7 mm) thickness.



Aft Regulating and Safety Valves
Figure 403

(4) Install pipes (13), (2) and (6) on valve.

(5) Install bonding strip (12).

(6) Connect electrical connectors (4) and (9).

(7) Install floor crossbeam (1) ; secure with bolts and nuts and install cotter pins.

R F. Test

R (1) Remove safety clips and tags and set the circuit brea-
R kers tripped in paragraph 3-B-(1).

B (2) Carry out Operation Test (Reference ADJUSTMENT/TEST).

R G. Close-Up

R (1) Close floor panel 243EF located aft of passenger
R compartment

REGULATING AND SAFETY VALVE - ADJUSTMENT/TEST

1. General

Check of cabin pressure control system after replacement of a system 1 or 2 regulating and safety valve.

2. Operational Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	

B. Prepare

(1) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SYS 2 FWD AFT DISCHARGE VALVE SUP 1	1-213	H1124	E13
LH U/C WEIGHT SW "A" SYS SUP		G 292	M17
RH U/C WEIGHT SW "A" SYS SUP		G 295	M18
SYS 2 VAC PUMP SUP FWD FAN AUTO CONT	2-213	H1123	A16
SYS 2 DISCH VALVE POSN IND		H1129	A17
SYS 1 VACUM PUMP SUP FWD AUTO CONT		H1127	G17
SYS 2 PRESSN CONT SUP		H1159	H15
SYS 1 PRESSN CONT SUP		H1122	H16
SYS 1 DISCH VALVE POSN IND		H1128	H17
LH UC WEIGHT SW "B" SYS SUP	3-213	G 293	B 8
RH UC WEIGHT SW "B" SYS SUP		G 294	B 9
SYS 1 FWD AFT DISCHARGE VALVE SUP	5-213	H1125	E 8
SYS 1 GRD PRESSN CONT	15-215	H1157	E 3

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SYS 2 GRD PRESSN CONT	15-216	H1158	D23

(2) On Flight Engineer's CABIN PRESSURE CONTROL panel, check that :

(a) SYSTEM SELECT switches are in SYS 1 position.

(b) DISCHARGE VALVES SYS 1 - SYS 2 switches are in NORM position.

(c) DITCHING SYS 1 - SYS 2 switches are in NORM position.

(d) EMERGY DEPRESS NORM TEST switch is in NORM position.

(e) On both cabin pressure regulating selectors the altitude displayed is 0 ft (this can be corrected by means of knob A, if necessary).

(3) In flight compartment, on centre console, check that the 4 throttle control levers are in IDLE position.

(4) Connect electrical ground power unit, and energize the aircraft electrical network (Ref. 24-41-00, Servicing).
- On CABIN PRESSURE CONTROL panel, make certain that DISCHARGE VALVE POSIT flags are not displayed.

C. Test

(1) Test of System 1

(a) On Flight Engineer's CABIN PRESSURE CONTROL panel, place EMERGY DEPRESS NORMAL TEST switch in TEST position :
- On DISCHARGE VALVE POSIT indicator SYS 1 and SYS 2 valve position indicating tapes must be in SHUT position.

(b) On system 1 pressure regulating selector (on LH side of CABIN PRESSURE CONTROL panel) select an altitude of + 10.000 ft by means of knob A.
- On DISCHARGE VALVE POSIT indicator, SYS 1 valve position indicator tapes must be in OPEN posi-

tion, and SYS 2 tapes in SHUT position.

(c) On system 1 pressure regulating selector, select an altitude of - 5000 ft.
- On DISCHARGE VALVE POSIT indicator, SYS 1 and SYS 2 valve position indicating tapes must display SHUT.

(d) Place EMERGY DEPRESS NORM TEST switch in NORM position.
- On DISCHARGE VALVE POSIT indicator, SYS 1 and SYS 2 valve position indicator tapes must display OPEN.

(e) Place SYS 1 DISCHARGE VALVES switch in FWD SHUT
- On DISCHARGE VALVE POSIT indicator. The valve position indicating tapes must have the following configurations :

  - SYS 1 FWD in SHUT position
  - SYS 1 AFT in OPEN position
  - SYS 2 FWD and AFT in OPEN position.

(f) Place DISCHARGE VALVES SYS 1 switch in NORM then in AFT SHUT position.
- On DISCHARGE VALVE POSIT indicator, the valve position indicating tapes must have the following configurations :

  - SYS 1 FWD in OPEN position
  - SYS 1 AFT in SHUT position
  - SYS 2 FWD and AFT in OPEN position

(g) Place DISCHARGE VALVES SYS 1 switch again in NORM position.
- On DISCHARGE VALVE POSIT indicator, SYS 1 - SYS 2 tapes must be in OPEN position.

(2) Test of System 2

(a) On Flight Engineer's CABIN PRESSURE CONTROL panel, place EMERGY DEPRESS NORM TEST switch in TEST position.
- On DISCHARGE VALVE POSIT indicator, SYS 1 and SYS 2 valve position indicating tapes must be in SHUT position.

(b) Place SYSTEM SELECT switch in SYS 2 position.
- No change occurs.

(c) On system 2 pressure regulating selector (on

RH side of CABIN PRESSURE CONTROL panel) select an altitude of + 10.000 ft by means of knob A. On DISCHARGE VALVE POSIT indicator, system 2 valve position indicator tapes must be in OPEN position, and system 1 tapes in SHUT position.

(d) On system 2 pressure regulating selector, select an altitude of - 5000 ft.
- On DISCHARGE VALVE POSIT indicator, SYS 1 - SYS 2 valve position indicator tapes must indicate SHUT.

(e) Place EMERGY DEPRESS NORM TEST switch in NORM position.
- On DISCHARGE VALVE POSIT indicator, SYS 1 - SYS 2 valve position indicating tapes must be in OPEN position.

(f) Place DISCHARGE VALVES SYS 2 switch in FWD SHUT position.
- On DISCHARGE VALVE POSIT indicator, SYS 2 FWD valve position indicating tape must be in the following configurations :

  - SYS 2 FWD in SHUT position
  - SYS 2 AFT in OPEN position
  - SYS 1 FWD and AFT in OPEN position

(g) Place DISCHARGE VALVES SYS 2 switch in NORM position, then in AFT SHUT position.
- On DISCHARGE VALVE POSIT indicator, the valve position indicating tapes must have the following configurations :

  - SYS 2 FWD in OPEN position
  - SYS 2 AFT in SHUT position
  - SYS 1 FWD and AFT in OPEN position

(h) Return DISCHARGE VALVES SYS 2 switch to NORM position.
- On DISCHARGE VALVE POSIT indicator the valve position indicating tapes must be in OPEN position.

D. Close-Up

(1) De-energize the aircraft electrical network, and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

HEATED STATIC PRESSURE PORTS - REMOVAL/INSTALLATION

1. General
(Ref. Fig. 401)

Location of heated static pressure ports A.B.C.D.E. 538 is shown in figure and table below.

2. Pressure Heated Static Ports A.B.C.D.E. 538

A. Equipment and Materials for static ports A.C.E. 538

DESCRIPTION	PART NO.
Access Platform 14 ft. 8 in. (4.47 m)	
Sealants Ref. 20-30-00, No. 352	
Shrink Sleeve	

B. Equipment and Materials for static ports B 0538

DESCRIPTION	PART NO.
Access Platform 10 ft. 3 in. (3.141 in.)	
Shrink Sleeve	

C. Prepare for static ports A538 or E538

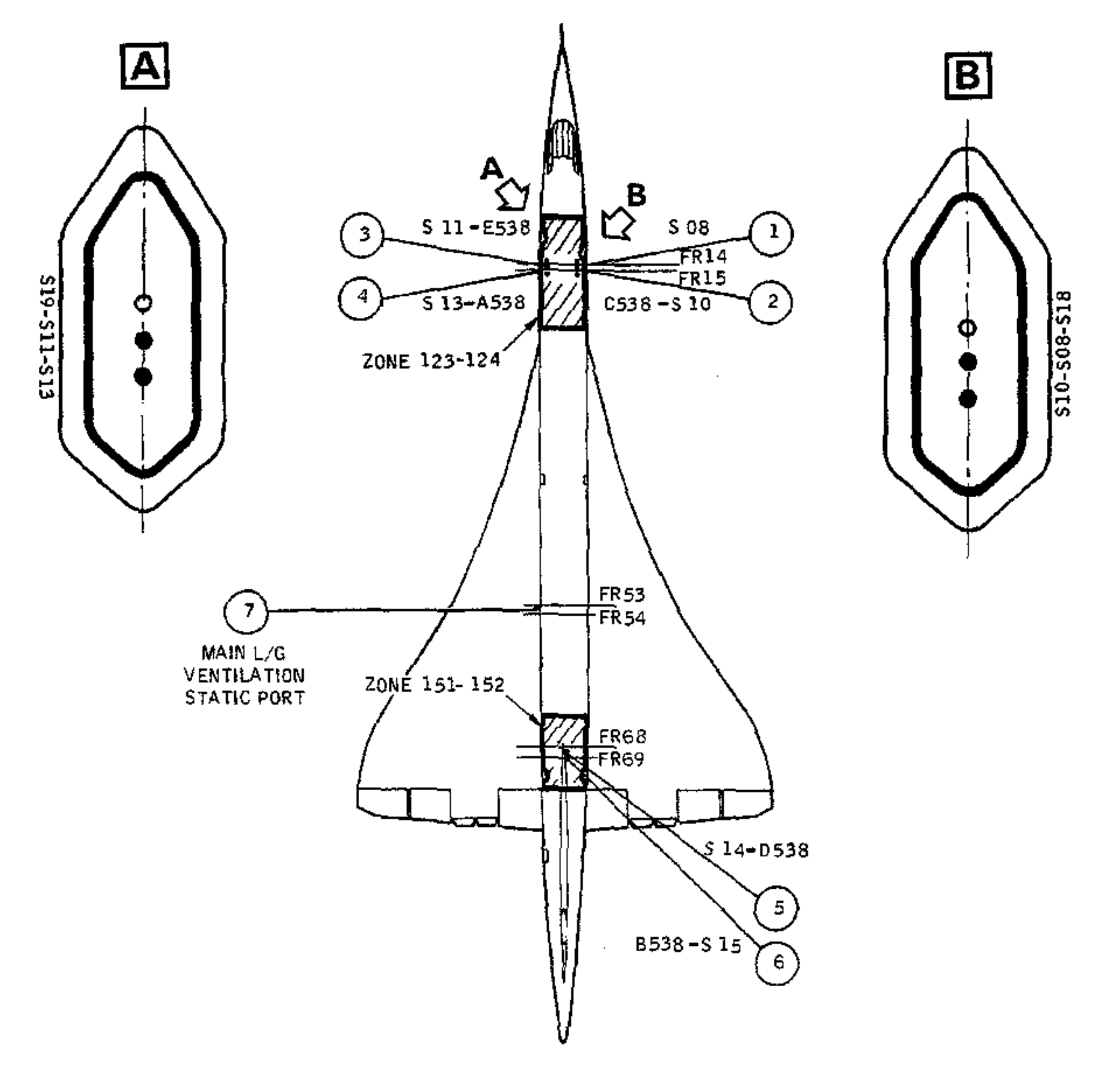
(1) Position access platform.

(2) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH STATIC VENT HTR SUP	15-215	H 491	G10

R (3) Remove Galley (Ref. 25-24-31, Removal/Installation and
R 25-33-20, Removal/Installation.

R (4) In passenger compartment, between FR14 and FR15, open



6	STATIC PORT L.H AFT VALVE	HEATED	S 15	B538
5	STATIC PORT R.H AFT VALVE	HEATED	S 14	D538
4	STATIC PORT L.H FWD VALVE	HEATED	S 13	A538
3	STATIC PORT L.H AMPLIFIER	HEATED	S 11	E538
2	STATIC PORT R.H FWD VALVE	HEATED	S 10	C538
1	STATIC PORT R.H AMPLIFIER	NOT HEATED	S 08	

R

Location of Heated Static Pressure Ports
Figure 401

R floor panels 221BF, 221EF, 221FF.

D. Prepare for static port C538

(1) Position access platform.

(2) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RH STATIC VENT HTR SUP	15-216	H 492	D17

(3) In passenger compartment between frames 14 and 15, open floor panel 222EF.

E. Prepare for static ports B538

(1) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH STATIC VENT HTR SUP	15-215	H 491	G10

(2) Under the fuselage, in zone 151-152 between frames 67 and 68 :

(a) Position access platform.

(b) Open access door 151CB.

F. Prepare for static port D538

(1) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RH STATIC VENT HTR SUP	15-216	H 492	D17

(2) Under the fuselage, in zone 151-152 between frames 67 and 68.

(a) Position access platform.

(b) Open access door 151CB.

G. Remove static ports A538 or E538 (Ref. Fig. 402)

(1) In passenger compartment, remove air duct (5) (access through floor panels 221BF-EF-FF).

(a) Remove muff duct joint (1).

(b) Unscrew and push clamp (2) backwards.

(c) Remove retaining pivots and clips (3) (4).

(d) Remove supports (6).

(e) Carefully remove duct (5).

(2) Remove insulating mattress in the vicinity of static port to be removed.

(3) Disconnect pipe (7), retain gasket (12) and union (13).

(4) Remove shrink sleeve (9) protecting static port electrical connectors.

(5) Unlock, unscrew nut, retain electrical connector (8) washer and screw.

(6) Unlock and unscrew the 4 nuts (10), retain washers.

(7) Remove static port by moving it rearwards ; retain shim (11).

(8) Clean static port location ; remove traces of sealing product.

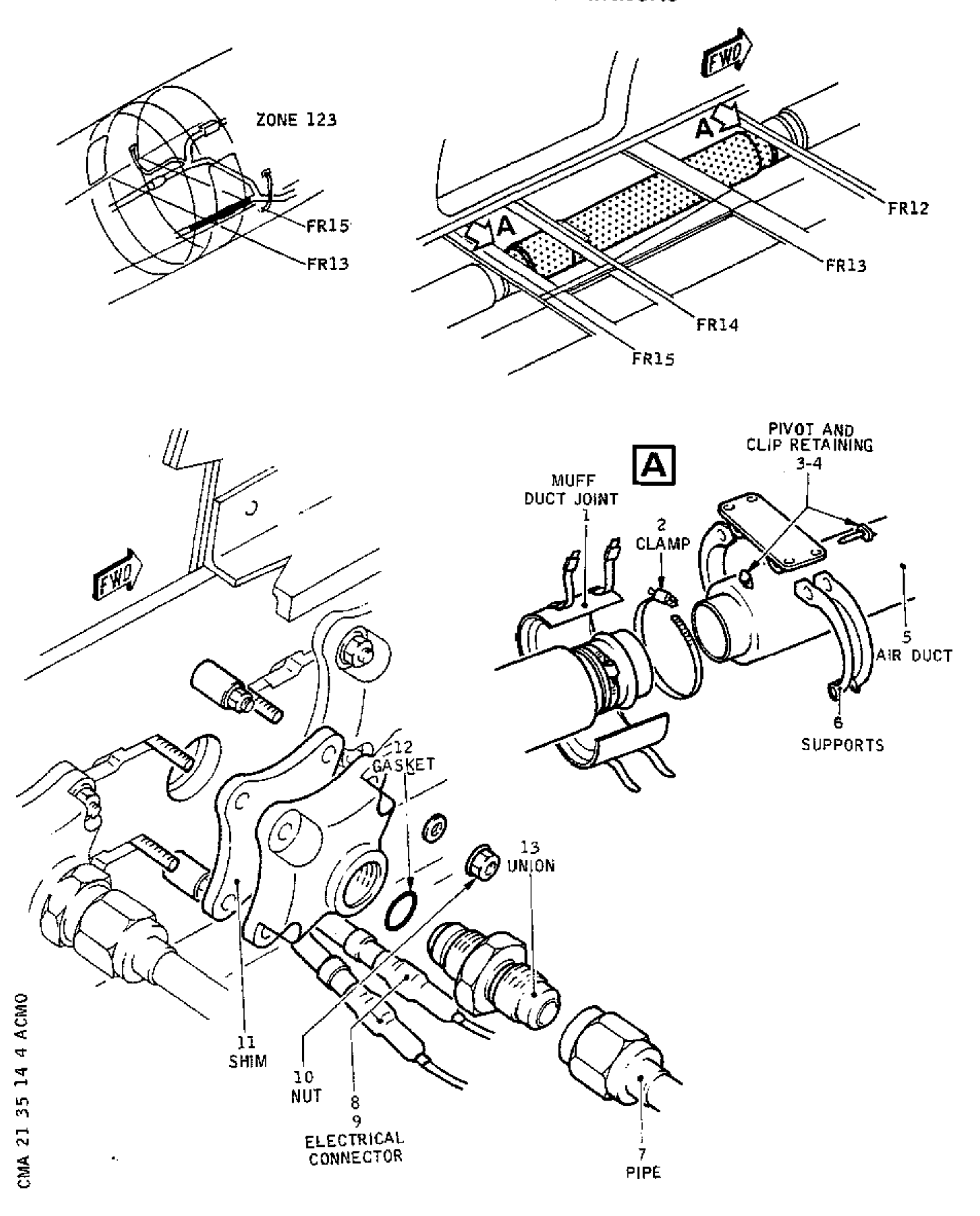
H. Remove static port C538 (Ref. Fig. 403)

(1) Gain access to the cabin through floor panel 222EF ; remove the insulating mattress in the vicinity of static port to be removed.

(2) Disconnect pipe (6) retain gasket (4) and union (5).

(3) Remove shrink sleeve (3) protecting static port electrical connectors.

(4) Unlock, unscrew nuts, retain screws and washers of electrical connectors.



Heated Static Port A538 or E538
Figure 402

(5) Unlock and unscrew the 4 nuts (2), retain washers.

(6) Remove static port by slightly moving it rearwards ; retain shim (1).

(7) Clean location of static port, remove traces of sealing product.

J. Remove static port B538 or D538 (Ref. Fig. 404)

(1) Gain access to cargo compartment through access door 151CB ; disconnect pipe (1), retain gasket (3) and union (2).

(2) Remove shrink sleeve protecting static port electrical connector (5).

(3) Unlock, unscrew nuts, retain screws and washers of electrical connectors.

(4) Under the fuselage, unlock and unscrew the four nuts (9), retain washers and the four bolts (7).

(5) Remove static connector by slightly moving it rearwards, retain shim (8).

(6) Clean location of static port,, remove traces of sealing product.

K. Preparation of Replacement Component A.B.C.D.E.538

(1) Remove blanking caps from static ports.

(2) Make certain that the equipment bears no evidence of damage and distortion.

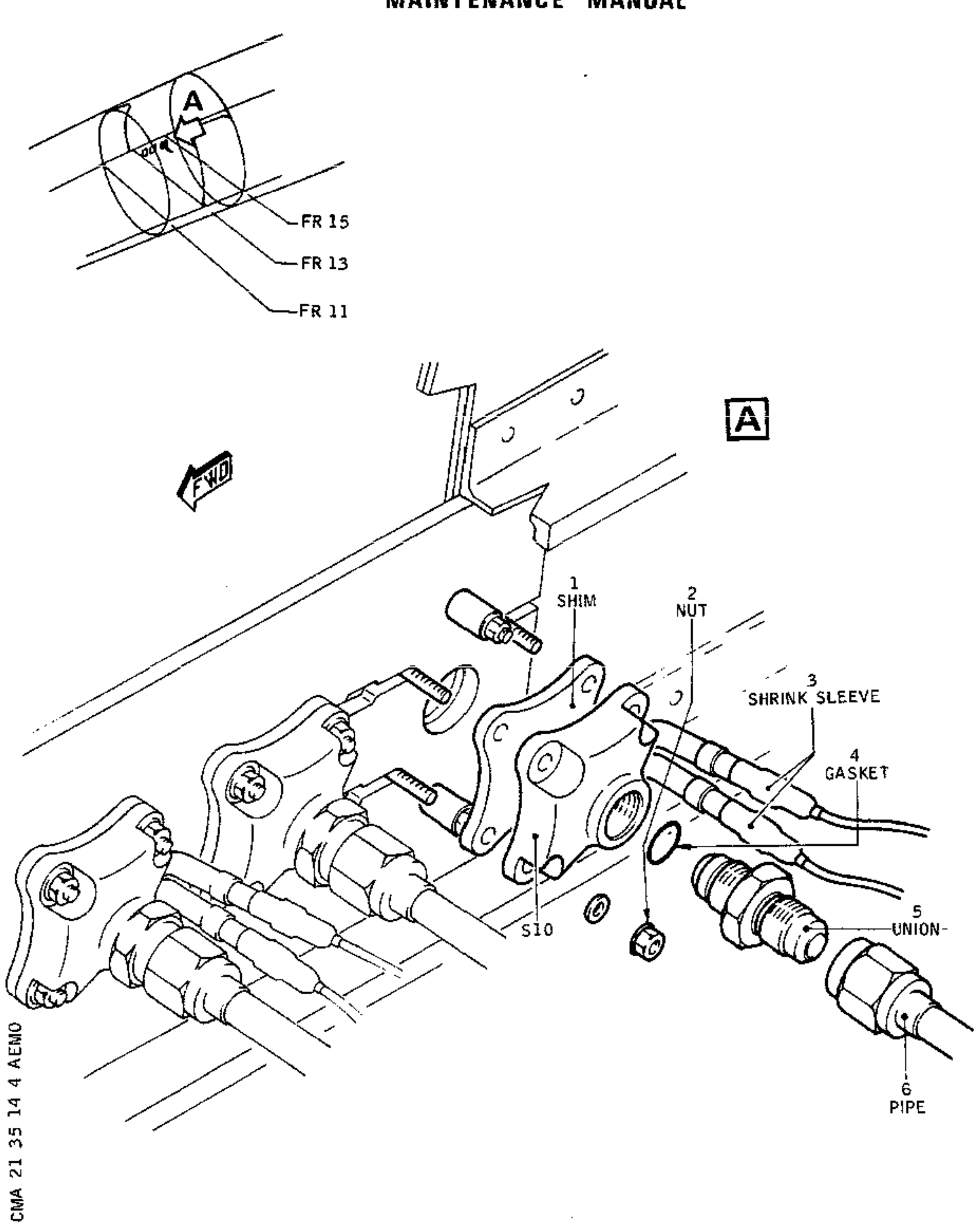
(3) Check ceramic insulators for evidence of damage (cracks, etc.).

L. Install test port A538 or E538
(Ref. Fig. 402)

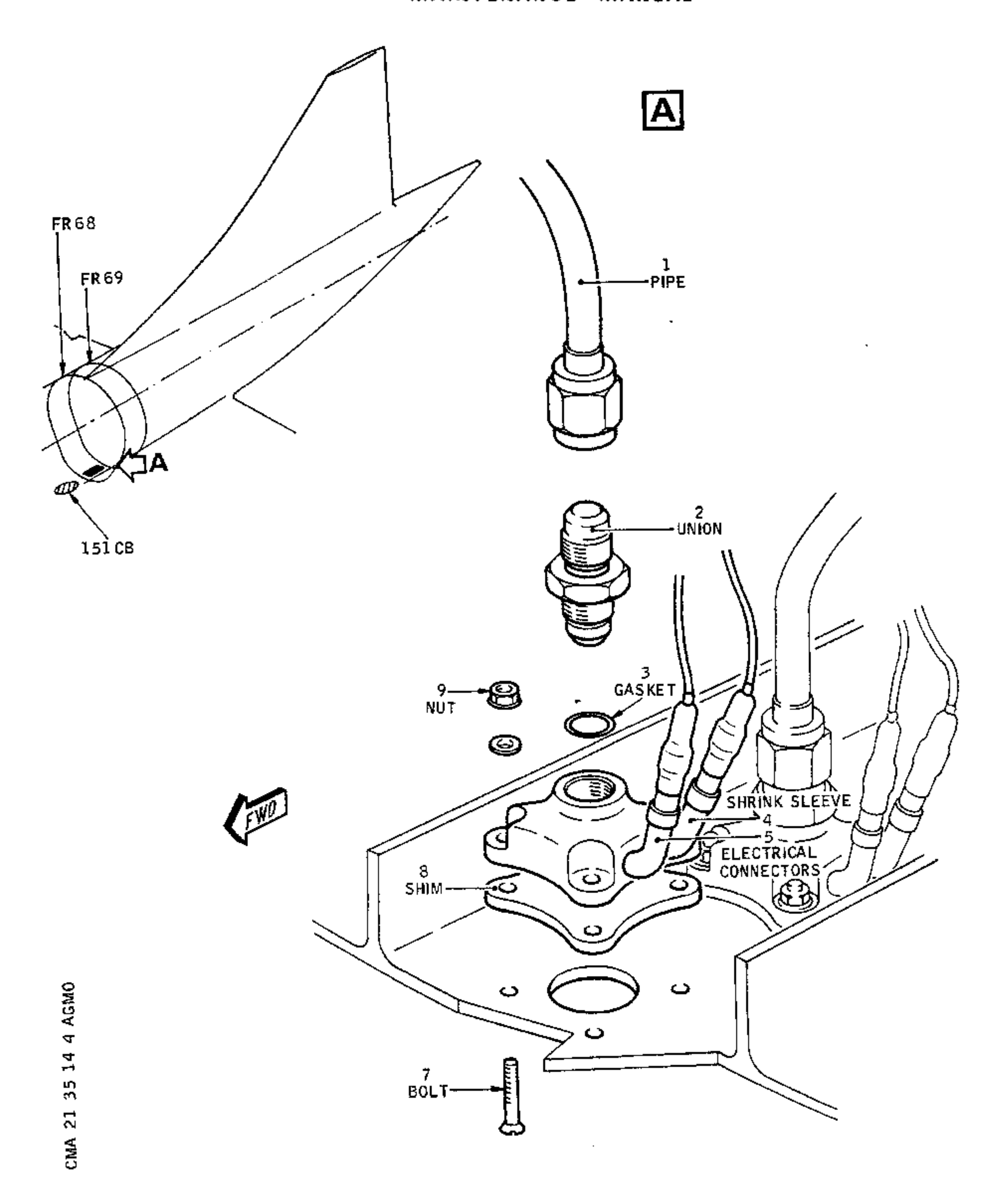
(1) Install shim (11) and static port in its location.

<u>Note 1</u> : The assembly is sealed with sealant No. 352 ; follow instructions of chapter 20-22-12.

<u>Note 2</u> : When static port is installed, it must be flush with the fuselage.
The out-of-flush tolerance is - 0.002 in.



Heated Static Port C538
Figure 403



Heated Static Port B538, D538
Figure 404

(- 0.05 mm)
The correct dimension is obtained by adjusting shim thickness (11).

(2) Install the four washers, screw and tighten the four nuts (10). Torque to between 25 and 30 lbf.in. (0.3 and 0.35 m.daN).

(3) Engage a shrink sleeve (9) on each cable.

(4) Connect cables to static port in corresponding receptacle : cable 1 in receptacle 1, cable 2 in receptacle 2.

(5) Install shrink sleeve (9) on connectors. Heat until it has shrunk sufficiently.

(6) Install a new gasket (12). Screw union (13). Connect pipe (7).

(7) Install insulating mattress.

(8) Install and connect duct (5), assemble supports (6), tighten clamp (2).

M. Install static port C538
(Ref. Fig. 403)

(1) Install shim (1) and static port in their location.

<u>Note 1</u> : The assembly must be sealed with sealant No. 352. Follow instructions of chapter 20-22-12.

<u>Note 2</u> : When static port is installed it must be flush with the fuselage.
The out-of-flush tolerance is - 0.002 inch (- 0.05 mm)
The correct dimension is obtained by liming shim (6).

(2) Install the four washers, screw and tighten the four nuts. (Torque to between 25 and 30 lbf.in. (0.3 to 0.35 m.daN).

(3) Engage a shrink sleeve (3) on each cable.

(4) Connect cables to static port in corresponding receptacle : cable 1 in receptacle 1, cable 2 in receptacle 2.

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(5) Install shrink sleeve (3) on connectors. Heat until it has shrunk sufficiently.

(6) Install a new gasket (4). Screw union (5), connect pipe (6).

(7) Install insulating mattress.

N. Install static ports B538 or D538 (Ref. Fig. 404)

(1) Install shim (8) and static port in its location.

NOTE : The static port must be flush with the fuselage.
The out-of-flush tolerance is - 0.002 inch (- 0.05 mm)
The correct dimension is obtained by adjusting the shim thickness ; if static port stands out (by 0.002 inch (0.05 mm) maximum), rework it so that it is flush with the fuselage.

(2) Install the four bolts (7) under the fuselage.

(3) On static port, install the four washers, screw and tighten the 4 nuts (9). Torque to between 25 and 30 lbf.in. (0.3 and 0.35 m.daN).

(4) Engage a shrink sleeve (4) on each cable.

(5) Connect cables to static port in corresponding receptacle : cable 1 in receptacle 1, cable 2 in receptacle 2.

(6) Install shrink sleeves (4) on connector. Heat until they have shrunk sufficiently.

(7) Install a new gasket (3), screw union (2), connect pipe (1).

P. Test of Heated Static Ports A-B-C-D-E538

Ref. 21-35-14, Adjustment/Test.

Q. Close-Up for Static Ports A538 or E538

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) Close floor panels 221BF-221EF-221FF.

R (3) Install galley.

R (4) Remove access platform.

R. Close-Up for Static Port C538

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) Close access door 222EF.

(3) Remove access platform.

S. Close-Up for static port B538 or D538

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) Close access door 151CB.

(3) Remove access platform.

STATIC PRESSURE PORTS - ADJUSTMENT/TEST

1. General

R
System leakage test after replacement of a static pressure
R port.

2. Operational Leakage Test of Static Ports

R A. Equipment and Materials for Static Ports A-C-E 538 and SO8

DESCRIPTION	PART NO.
R Access Platform 14 ft. 8 in. (4.47 m)	
Adapter - Static Ports	T8751E22783002
R Test Set - Pitot/Static	

R B. Equipment and Materials for Static Ports B and D 538

DESCRIPTION	PART NO.
R Access Platform 10 ft. 8 in. (3.25 m)	
Adapter - Static Vents	D925403002
R Test Set - Pitot/Static	

C. Not applicable

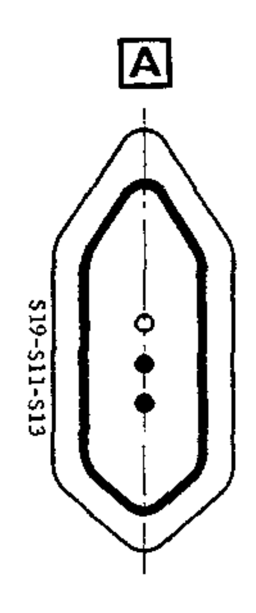
D. Prepare for Static Ports A, C, E 538 and SO8
(Ref. Fig. 501)

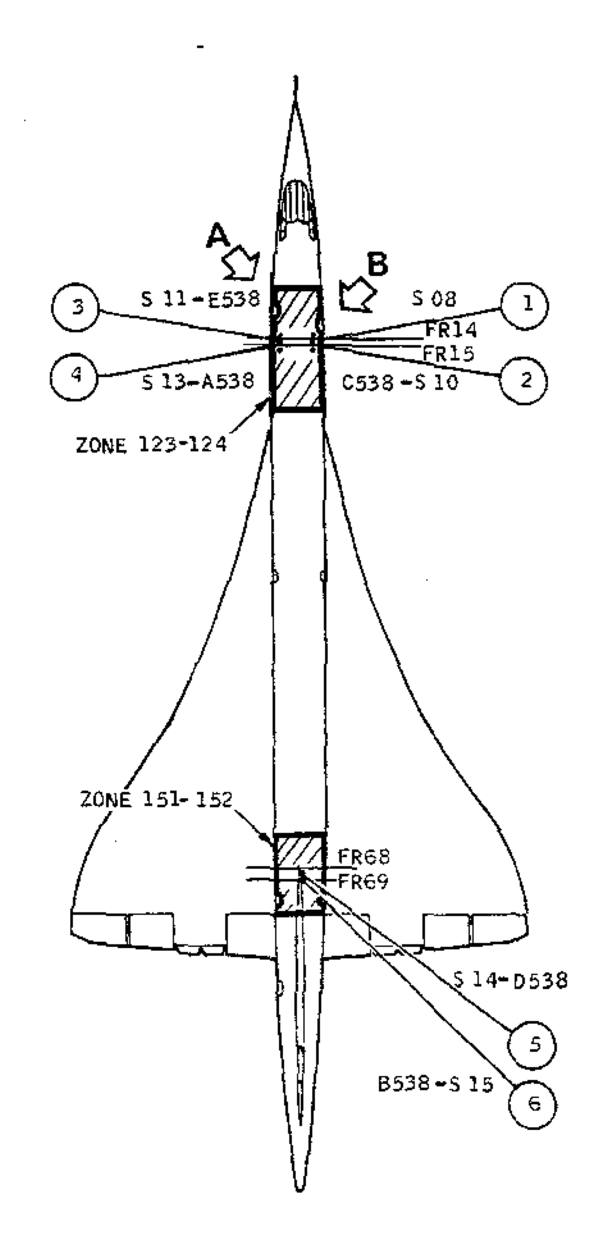
(1) Position access platform.

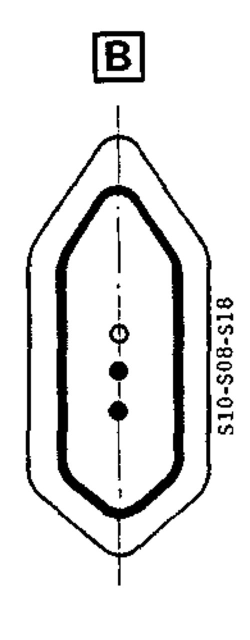
R (2) Connect adapter T8751E22783002 to replacement static
R ports : A 538 (4) or E 538 (3) on LH side of aircraft,
R C 538 (2) or SO8 (1) on RH side of aircraft.

R (3) Connect pitot/static test set to static set to static
R port adapter.

E. Prepare for Static Ports B and D 538







CMA 21 35 14 5 ACM0

6	STATIC PORT L.H AFT VALVE	HEATED	S 15	B538
5	STATIC PORT R.H AFT VALVE	HEATED	S 14	D538
4	STATIC PORT L.H FWD VALVE	HEATED	S 13	A538
3	STATIC PORT L.H AMPLIFIER	HEATED	S 11	E538
2	STATIC PORT R.H FWD VALVE	HEATED	S 10	C538
1	STATIC PORT R.H AMPLIFIER	NOT HEATED	S 08	

Static Ports Location on Aircraft
Figure 501

(Ref. Fig. 501)

(1) Position access platform.

R (2) Connect static vents adapter D925403002 to replacement
R static port B 538 (6) or D 538 (5).

R (3) Connect pitot/static test set to static vents adapter.

F. Not applicable

G. Leakage Test (Identical for all static ports)

R (1) With pitot/static test set in operation, open shut off
R valve until 29,700 ft. altitude/pressure is read on
R the pressure gauge of test set.

R (2) When this altitude is reached, close shut off valve.

R (3) After a 5 minute time delay, the displayed altitude/
R pressure must not drop below 29,300 ft.

R (4) Slowly restore altitude/pressure to ambient.

H. Close-Up

R (1) Shut down operation of pitot/static test set.

R (2) Disconnect pitot/static test set.

R (3) Remove adapter from static port.

R (4) Upon commpletion of leakage test, perform a heating
R system test of static ports (A, B, C, D or E238) as
R detailed in 30-31-00, Adjustment/Test.

R (5) Remove access platform.

STATIC PRESSURE PORT DRAIN VALVE - REMOVAL/INSTALLATION

1. General

Location of drain containers of static pressure port drain valves is shown in the figure.
(Ref. Fig. 401)

2. Static Pressure Port Drain Valve

A. Equipment and Materials for Static Pressure Port Drain Valves S8 - S11

DESCRIPTION	PART NO.
Access Platform 12 ft. (3. 700 m)	
Corrosion Resistant Steel Lockwire Dia. 0.41 in. (1 mm)	

B. Equipment and Materials for Static Pressure Port Drain Valves in Zone 125-126

DESCRIPTION	PART NO.
Access Platform 10 ft 7in (3.20 m)	

C. Equipment and Materials for Drain Valves on Regulating and Safety Valves Zone 167 - 168.

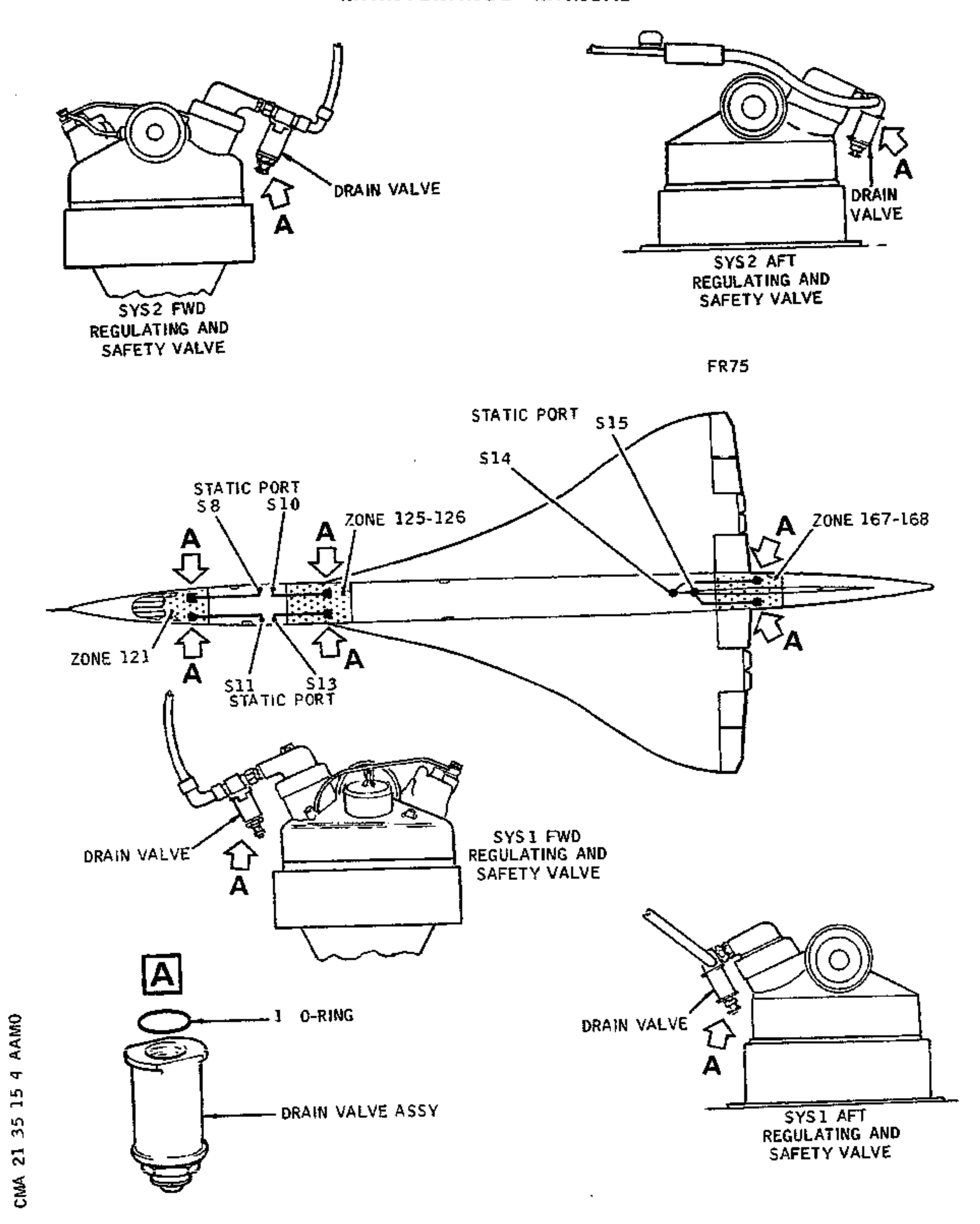
DESCRIPTION	PART NO.
None	

D. Prepare for Drain Valves of Static Pressure Ports S8 - S11

(1) Position access platform under the fuselage, in zone 121-122.

(2) Open access door 121FB.

E. Prepare for Drain Valves on Regulating and Safety Valves Zone 125 - 126



Location of Static Pressure Port Drain Valve
R Figure 401

(1) Position access platform under the fuselage in zone 131.

(2) Open cargo compartment door 811.

(3) In cargo compartment, open access panel 131AS.

F. Prepare for Drain Valves on Regulating and Safety Valves in Zone 167 - 168

(1) In aft passenger compartment, open floor panel 243EF located between frames 74 and 75.

G. Remove Drain Valves of Static Pressure Ports S8 - S11

(1) Cut lockwire of drain valve to be removed.

(2) Unlock and remove drain valve.

H. Remove Drain Valves on Regulating and Safety Valves in Zone 125 - 126 or 167 - 168

(1) Unlock and remove drain valve associated with the relevant regulating and safety valve (access through door 131AZ under the fuselage for valves located in zone 125 - 126 ; access through floor panel 243EF in passenger compartment for valves located in zone 167 - 168).

J. Preparation of Replacement Component

(1) Remove protective cap.

(2) Make certain that the replacement component bears no evidence of dents, scratched paint or distortions.

(3) Install a new seal (1).

(4) Make certain that the valve operates correctly.

K. Install Drain Valves on Static Pressure Ports S8 - S11

(1) Install and tighten drain valve.
Torque to between 40 and 50 lbf. in..
(0.45 and 0.56 m.daN).

NOTE : The drain valve must be installed according to procedures detailed in chapter 20-23-11.

(2) Wirelock drain valve.

L. Install Drain Valves on Pressure Regulating and Safety Valves in Zones 125 - 126 or 167 - 168

(1) Install and screw drain valve on relevant pressure regulating and safety valve. Torque to between 40 and 50 lbf.in. (0.45 and 0.56 m.daN).

NOTE : The drain valve must be installed according to the procedures detailed in chapter 20-23-11.

M. Leakage Test Common to All Drain Valves. Ref. 21-35-14, Adjustment/Test.

N. Close-Up

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(1) Close up for drain valves of static ports S8 - S11.

(a) Under the fuselage, close cargo compartment door 121FB.

(b) Remove access platform.

(2) Close up for drain valves on pressure regulating and safety valves in zone 125 - 126.

(a) Under the fuselage in zone 131, close access door 131AS.

(b) Close access door 811.

(c) Remove access platform.

(3) Close up for drain valves on pressure regulating and safety valves in zone 167 - 168.

(a) In aft passenger compartment close floor panel 243EF.

STATIC PRESSURE PORT DRAIN VALVE - INSPECTION/CHECK

1. General

Check and purge of drain container of static port drain valves in pressure regulating system.
(Ref. Fig. 601)

2. Pressure Static Port Drain Valve

A. Equipment and Materials for Pressure Static Port Drain Valves S8, S11

DESCRIPTION	PART NO.
Access Platform 12 ft. (3.672 m)	

B. Equipment and Materials for Pressure Regulating and Safety Valve Drain Valves, zone 125-126

DESCRIPTION	PART NO.
Access Platform 10 ft. 7 in. (3.220 m)	

C. Equipment and Materials for Pressure Regulating and Safety Valves Drain Valves, zone 167-168

DESCRIPTION	PART NO.
Not applicable	

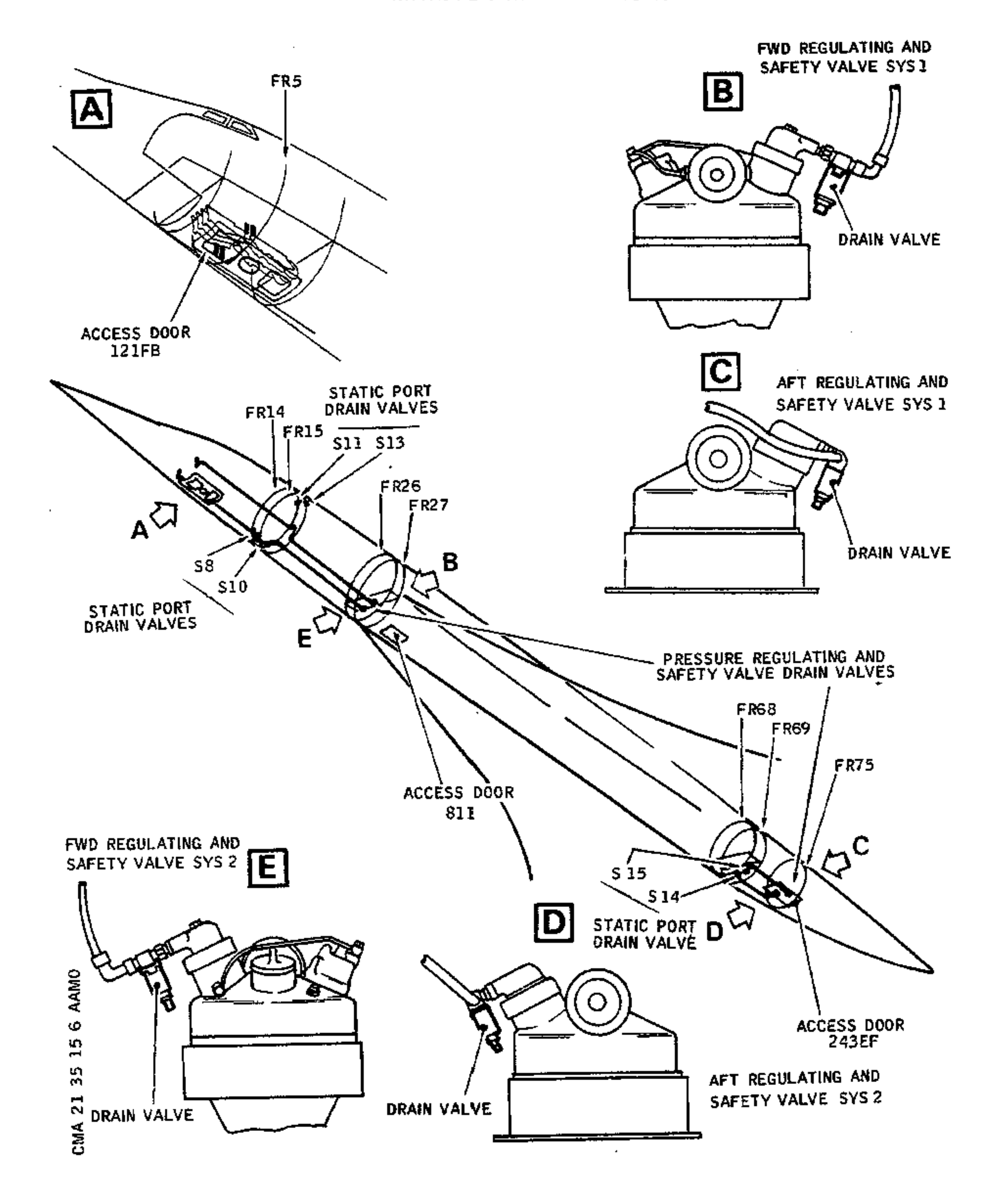
D. Prepare for Static Pressure Port Drain Valves S8-S11

(1) Position access platform under the fuselage in zone 121-122.

(2) Open access door 121FB.

E. Prepare for Pressure Regulating and Safety Valve Drain Valves, zones 125-126

(1) Position access platform under the fuselage in zone 131.



Location of Static Pressure Port Drain Valve
Figure 601

R

(2) Open cargo compartment door 811.

(3) In cargo compartment, open access panel 131AS.

F. Prepare for Pressure Regulating and Safety Valve Drain Valves zone 167-168

(1) Open floor panel 243EF located between frames 74 and 75.

G. Purge of Pressure Regulating and Safety Valve and Static Port Drain Valves (Ref. Fig. 601)

(1) Place a container under the relevant drain valve.

(2) Press pushbutton taking care not to obstruct the evacuation orifice. Release push-button when water stops dripping ; wipe off remaining water, remove the container.

(3) Check that push-button has returned to its initial position.

H. Close-Up

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MUSCELLANEOUS ITEMS OF EQUIPMENT.

(1) Close-Up for Static Port Drain Valves S8-S11.

(a) Close access door 121FB.

(b) Remove access platform.

(2) Close-Up for Pressure Regulating and Safety Valve Drain Valve zone 125-126

(a) Install access panel 131AS in cargo compartment.

(b) Close access door 881.

(c) Remove access platform.

(3) Close-Up for Pressure Regulating and Safety Valve Drain Valves zone 167-168

(a) Install floor panel 243EF.

GROUND PRESSURIZING CONNECTION - REMOVAL/INSTALLATION

1. General

Ground pressurizing connection 519 is located in zone 151-152 between frames 66 and 67.

2. Ground Pressurizing Connection - Item 519 (Ref. Fig. 401)

A. Equipment and Materials

DESCRIPTION	PART NO.
General Lubricant Ref. 20-30-00, No. 59	
Access Platform 10 ft. 7 in. (3.22 m)	
Corrosion-Resistant Lockwire 0.041 in. (1 mm)	

B. Prepare

(1) Open floor panel 241AF located in passenger compartment between frames 66 and 67.

(2) Position access platform.

(3) Under the fuselage, open access door 151CB in zone 151-152.

C. Remove

(1) Gain access to cargo compartment, zone 151-152 through access door 151CB.

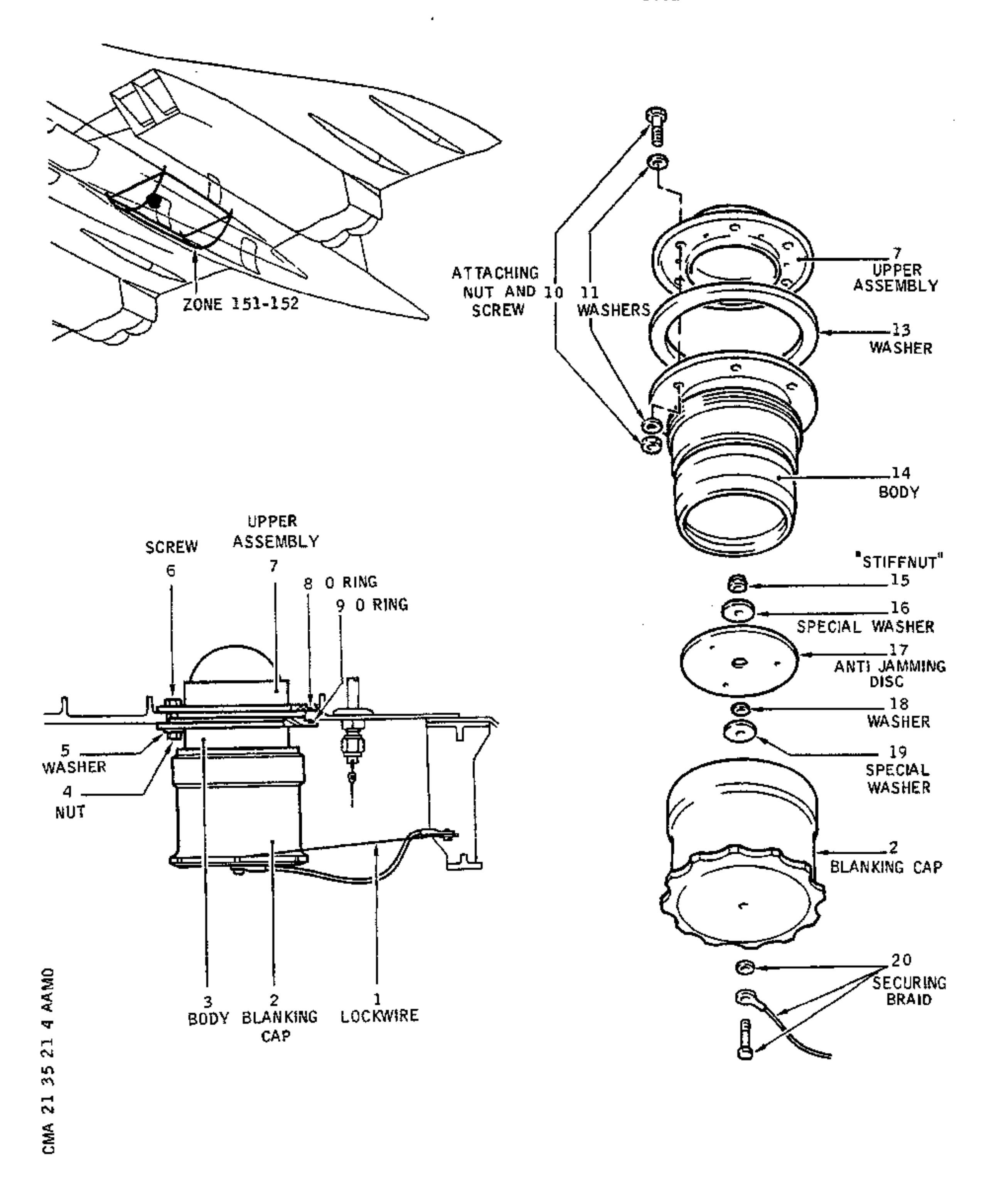
(a) Cut lockwire (1).

(b) Unscrew blanking cap (2).

(2) Inside blanking cap :

(a) Unlock and unscrew stiffnut (15).

(b) Successively remove special washer (16), anti-jamming disc (17), washer (18), special washer (19).



Ground Pressurizing Connection
Figure 401

(c) Remove the screw, securing braid, and nut assembly (20).

NOTE : The other end of securing braid is attached to the structure by a rivet, this assembly (20) will be re-used when the new equipment is installed. Check condition of securing braid.

(3) Unlock the six nuts (4).

(4) Hold body (3), unscrew the six nuts (4), retain washers (5).

(5) Remove body (3).

(6) If necessary, remove O-ring (9) which may remain stuck to the structure.

(7) Open floor panel 241AF located in passenger compartment between frames 66 and 67.

(a) Remove upper assembly (7).

(b) Retain the six screws (6).

(8) If necessary, remove O-ring (8) which may remain stuck to the structure.

D. Preparation of Replacement Component

(1) Make certain that the equipment bears no evidence of damage or scratched paint.

(2) Unlock and unscrew the six attaching nuts and screws (10), retain washers (11) and (13).

(3) Manually check that both non-return valve flaps operate correctly and that spring force is equal for each of them.

(4) Install a new O-ring on upper assembly (7) and body (14).

(5) Unscrew blanking cap (2) from body (3).

(6) Inside blanking cap :

(a) Unlock and unscrew stiffnut (15).

(b) Successively remove : special washer (16), anti-

jamming disc (17), washer (18), special washer (19).

(c) Remove the nut, securing braid, screw assembly (20).

E. Install

(1) On blanking cap (2).

(a) Install the nut securing braid, screw assembly (20).

(b) Successively install special washer (19), washer (18), anti-jamming disc (17), special washer (16).

(c) Coat thread with Product No. 59.

(d) Screw and tighten stiffnut (15).

(2) Install upper assembly (7) on structure (access through floor panel 241AF in passenger compartment between frames 66 and 67)

(3) Install the six screws (6), coat thread with Product No. 59.

(4) Install body (3) and hold it (access through cargo compartment door 151CB)

(5) Install washer (5) ; screw and lock the six nuts (4) ; coat protruding threads with Product No. 59.

(6) Coat body (3) and blanking cap (2) thread with Product No. 59.

(7) Screw blanking cap (2) to body (3). Wirelock with corrosion-resistant lockwire 0.041 in. (1 mm).

F. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) In passenger compartment, close floor panel 241AF.

(3) Under the fuselage, close access door 151CB.

(4) Remove access platform.

VACUUM PUMP - REMOVAL/INSTALLATION

1. General

The removal/installation of the vacuum pump is dealt with in 21-35-11, Removal/Installation.

Printed in England

REGULATING AND SAFETY VALVE - REMOVAL/INSTALLATION

1. General

The removal/installation of the LH regulating and safety valve is dealt with in 21-35-12, Removal/Installation.

ALTITUDE SWITCH - REMOVAL/INSTALLATION

1. General

Replacement of altitude switch (H1103)

2. Altitude Switch (Ref. Fig. 401)

A. Equipment and Materials

DESCRIPTION	PART NO.

Not Applicable

B. Prepare

CAUTION : AS A SAFETY MEASURE, AND IN ORDER TO TAKE ALL PRECAUTIONS AGAINST INADVERTENT OPERATION OF CONTROLS, PLACE A WARNING NOTICE ON THE ELECTRICAL GROUND CONNECTOR PROHIBITING ENERGIZATION OF THE AIRCRAFT ELECTRICAL NETWORK.

(1) On Flight Engineer's EMERG GEN panel (6-214) check that BATT A-BATT B switches are in OFF position.

CAUTION : AS A SAFETY MEASURE, AND IN ORDER TO TAKE ALL PRECAUTIONS AGAINST INADVERTENT OPERATION OF CONTROLS, PLACE A WARNING NOTICE ON THE SWITCHES DESCRIBED IN THE PREVIOUS PARAGRAPH PROHIBITING OPERATION OF BATT A-BATT B SWITCHES.

(2) Open Flight Engineer's HYDRAULIC MANAGEMENT panel (held by 10 1/4 turn fasteners).

C. Remove

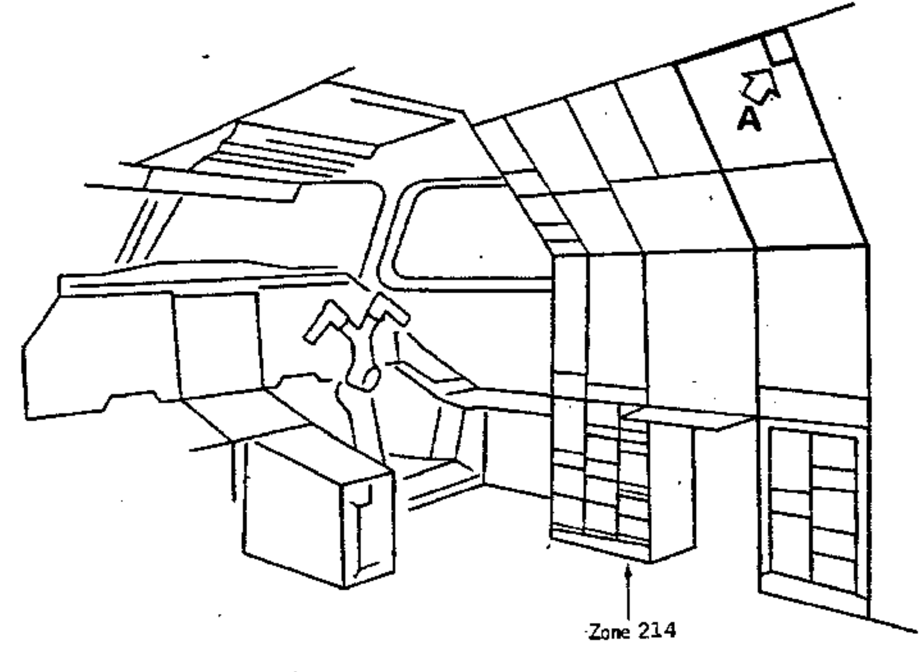
(1) On altitude switch (H1103) :

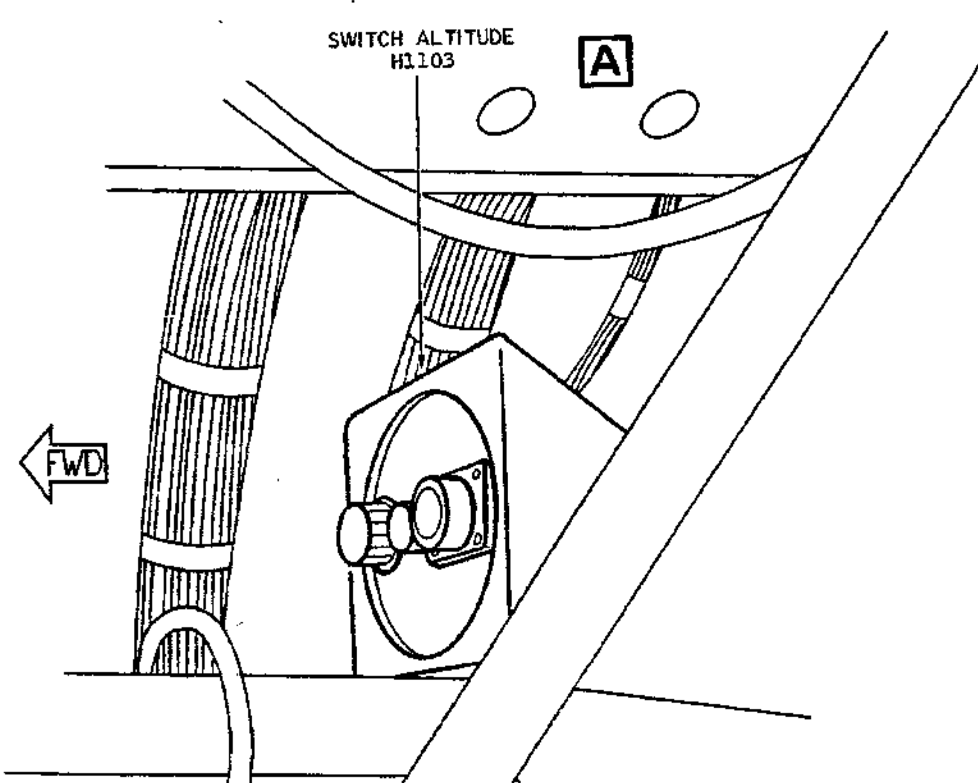
(a) Disconnect electrical connector H1103A.

(b) Remove the 4 screws securing altitude switch to its mounting.

(c) Remove altitude switch.

D. Preparation of Replacement Component





Altitude Switch H1103 Location
Figure 401

(1) Make certain that the altitude switch bears no dents, and that paint is not scratched etc.

(2) Remove protective plug from electrical connector, making certain that the terminals are not bent or damaged.

E. Install

(1) Position altitude switch on its mounting, proceeding as follows :

- Altitude switch test plug facing aircraft structure.
- Electrical connector facing equipment panel.

(2) Tighten the 4 screws securing altitude switch to mounting.

(3) Connect electrical connector H1103A to altitude switch connector.

B F. Deleted

B G. Close-Up

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

B (1) Remove warning notices quoted in paragraph (B)

(2) Close HYDRAULIC MANAGEMENT panel.

ALTITUDE SWITCH (H1103) - ADJUSTMENT/TEST

1. General

The altitude switch causes of the EXCESS ALT indicator light and PRESS warning light to illuminate at a cabin altitude of 1000 ± 0/500 ft.

2. Functional Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Negative Pressure Test Bench	
Adapter - Ventilation System	D921625001

B. Prepare

CAUTION : AS A SAFETY MEASURE, AND IN ORDER TO TAKE ALL PRECAUTIONS AGAINST INADVERTENT OPERATION OF CONTROLS, PLACE A WARNING NOTICE ON THE ELECTRICAL GROUND CONNECTOR PROHIBITING ENERGIZATION OF THE AIRCRAFT ELECTRICAL NETWORK.

(1) At flight engineer's EMERG GEN panel 6-214, check that BATT A and BATT B switches are in OFF position.

CAUTION : AS A SAFETY MEASURE, AND IN ORDER TO TAKE ALL PRECAUTIONS AGAINST INADVERTENT OPERATION OF CONTROLS, PLACE A WARNING NOTICE PROHIBITING OPERATION OF THE BATT A AND BATT B SWITCHES QUOTED IN B. (1).

(2) At Flight Engineer's station, open the HYDRAULIC MANAGEMENT panel.

(3) Connect negative pressure test bench to the altitude switch (H1103) test connector by means of adapter D921625001.

CAUTION : TAKE CARE NOT TO ALLOW THE CONNECTION BETWEEN THE ALTITUDE SWITCH AND TEST BENCH TO TOUCH OR REST ON THE PANEL WIRING. INSULATE IF NECESSARY.

(4) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
CABIN EXCESS ALT WARN IND	1-213	H1101	G11
AUDIO WARN SYS SUP1		W 371	M21
M.W.S. SUP1		W 252	N21
AUDIO WARN SYS SUP2	2-213	W 372	C17
M.W.S. SUP2		W 251	D15

C. Test

WARNING : THE WHOLE OF THE LOWER HALF OF THE PANEL (ELECTRICAL GENERATING CONTROL ZONE) HAS 115 VOLTS ELECTRICAL POWER SUPPLY.

(1) Remove warning notices, connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, S).

(2) Using negative pressure test bench, apply a pressure of 10 ± 0.029 PSI (697 ± 13/0 mbar) equivalent to an altitude of 10000 ± 0/500 ft.

- At flight engineer's station, on CABIN PRESSURE CONTROL panel EXCESS ALT indicator light must come on.
- In flight compartment, on master warning panel, PRESS warning light must come on ; the aural warning sounds (single stroke gong and repeater gong).

(3) Shut down test bench, and restore ambient pressure

- The indicator lights quoted above must go off, and the aural warnings must cease to sound.

(4) De-energize the aircraft electrical network and disconnect electrical ground power unit, taking the precautions described previously in para. B Prepare (1).

(5) Disconnect negative pressure test bench from altitude switch.

(6) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(7) Close HYDRAULIC MANAGEMENT panel.

D. Close-Up

(1) Remove warning notices

(a) From electrical ground connector

(b) From flight engineer's EMERG GEN panel.

PRESSURE REGULATING SELECTOR - REMOVAL/INSTALLATION

1. General

A. The pressure regulating selectors are installed, one on the LH side and one on the RH side, of Flight Engineer's panel 1-214. They are of identical construction, and the removal/installation procedure is the same for each one.

2. Pressure Regulating Selector
(Ref. Fig. 401)

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clip	
Electrical Ground Power Unit	

B. Prepare

(1) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SYS 1 PRESSN CONT SUP	2-213	H1122	H16
SYS 2 PRESSN CONT SUP		H1159	H15
3CM STN INST LTS SUP	13-216	L 377	L 6

C. Remove

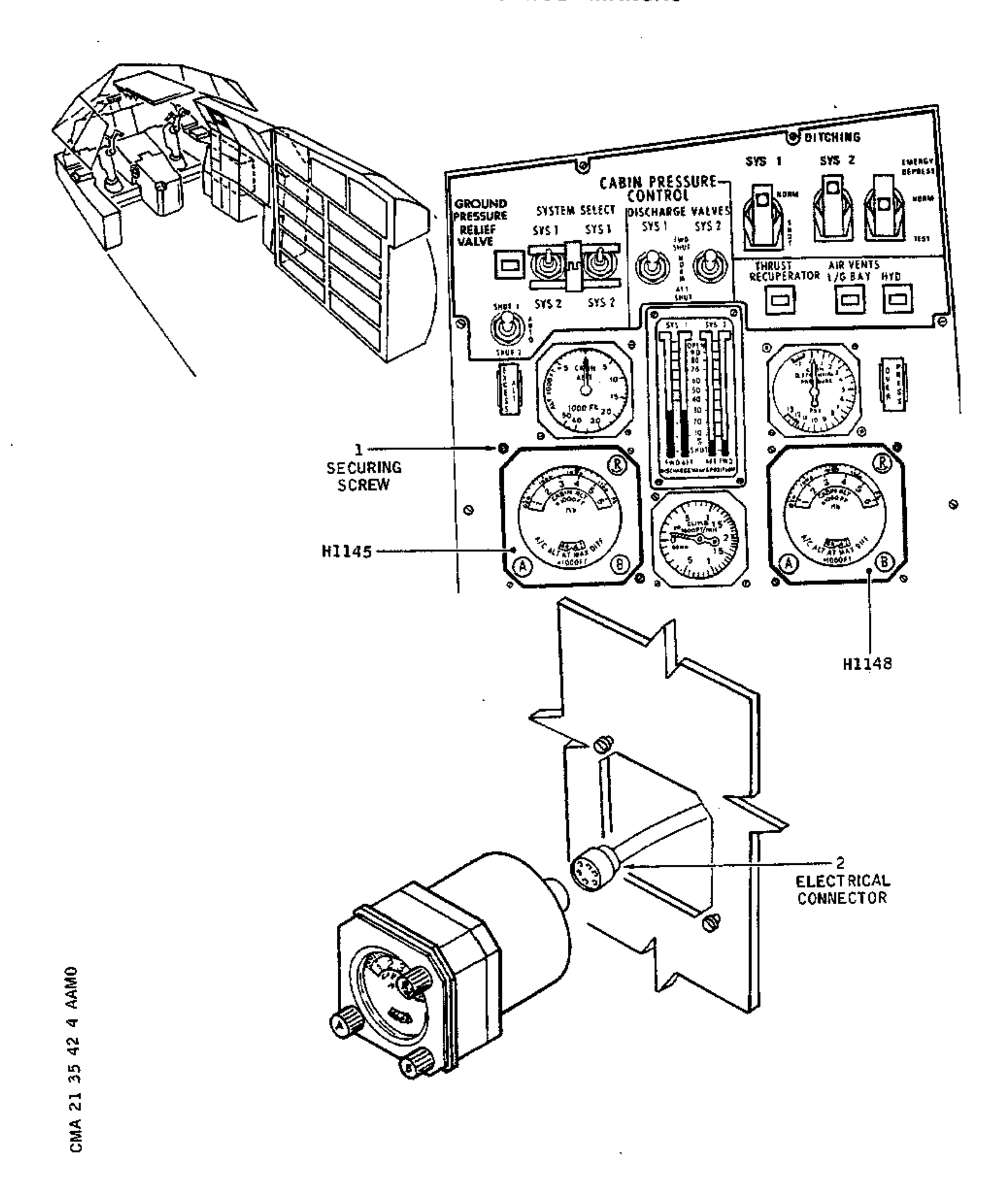
(1) At Flight Engineer's station, on CABIN PRESSURE CONTROL panel, remove both securing screws (1).

(2) Carefully pull cabin altimeter forward in order to remove electrical connector.

(3) Disconnect electrical connector (2).

(4) Remove pressure regulating selector.

D. Preparation of Replacement Component



Location of Pressure Regulating Selector
Figure 401

(1) Make certain that the selector bears no dent, scratched paint, etc.

(2) Remove protective plugs from electrical connector, and from static pressure port.
Make certain that the pins are not bent or damaged.

E. Install

(1) Connect electrical connector (2) to the selector.

(2) Install selector on panel ; make certain that electrical cables are not caught.

(3) Screw and tighten both screws (1) securing the selector to the panel.

F. Test

(1) Carry out test of pressure regulating selector, according to procedure described in 21-35-42, Adjustment/Test, paragraphs A2 to D2.

G. Close-Up

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

PRESSURE REGULATING SELECTOR - ADJUSTMENT/TEST

1. General

The purpose of the test is to check the cabin pressure control system after replacement of the SYS 1 - SYS 2 pressure regulating selectors H1145, H1148.

NOTE : The two systems are identical ; system 2 identifiers are shown in brackets.

2. Operational Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Circuit Breaker Safety Clips	

B. Prepare

(1) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SYS 2 FWD AFT DISCHARGE VALVE SUP 1	1-213	H1124	E13
LH U/C WEIGHT SW "A" SYS SUP		G 292	M17
RH U/C WEIGHT SW "A" SYS SUP		G 295	M18
SYS 2 VAC PUMP SUP FWD FAN AUTO CONT	2-213	H1123	A16
SYS 2 DISCH VALVE POSN IND		H1129	A17
SYS 1 VAC PUMP SUP FWD AUTO CONT		H1127	G17
SYS 2 PRESSN CONT SUP		H1159	H15
SYS 1 PRESSN CONT SUP		H1122	H16
SYS 1 DISCH VALVE POSN IND		H1128	H17

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW "B" SYS SUP	3-213	G 293	B 8
RH UC WEIGHT SW "B" SYS SUP		G 294	B 9
SYS 1 FWD AFT DISCHARGE VALVE SUP	5-213	H1125	E 8
SYS 1 GRD PRESSN CONT	15-215	H1157	E 3
SYS 2 GRD PRESSN CONT	15-216	H1158	D23

(2) On CABIN PRESSURE CONTROL Flight Engineer's panel, check that :

(a) SHUT 1 - AUTO-SHUT 2 switch is in AUTO position.

(b) SYS 1 - SYS 2 DISCHARGE VALVES switches are in NORM position.

(c) SYS 1 - SYS 2 DITCHING switches are in NORM position.

(d) EMERGY DEPRESS NORM TEST switch is in NORM position.

(e) 0 ft altitude is displayed on both cabin pressure regulating selectors (correct if necessary by means of knob A).

(3) In flight compartment, on centre console, check that the 4 throttle control levers are in IDLE position.

(4) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing). On CABIN PRESSURE CONTROL panel, make certain that DISCHARGE VALVE POSIT flags are not displayed.

C. Test

(1) On CABIN PRESSURE CONTROL Flight Engineer's panel, place EMERGY DEPRESS NORM TEST switch in TEST position.
- On DISCHARGE VALVE POSIT indicator SYS 1 and SYS 2 valve position indicating tapes must be in SHUT position.

(2) Place SYSTEM SELECT switch in SYS 1 (SYS 2) position.

(3) Trip, safety and tag circuit breaker G292, M17 panel 1-213.

(4) Select an altitude of 10,000 ft, by means of knob A, on pressure regulating selector of system 1 (left hand side of panel) or system 2 (right hand side of panel).
- On DISCHARGE VALVE POSIT indicator SYS 1 valve position indicating tapes must be in OPEN position, SYS 2 tapes in SHUT position (SYS 2 OPEN, SYS 1 SHUT).

(5) On system 1 (system 2) pressure regulating selector, select an altitude of - 5,000 ft.
- On DISCHARGE VALVE POSIT indicator, SYS 1 and SYS 2 valve position indicating tapes must be in SHUT position.

R (6) Remove safety clip and tag, and reset circuit breaker
R G292, M17, panel 1-213.

R (7) Place EMERGY DEPRESS NORM TEST switch in NORM position.
- On DISCHARGE VALVE POSIT indicator, SYS 1 and SYS 2 valve position indicating tapes must be in OPEN position.

D. Close-Up

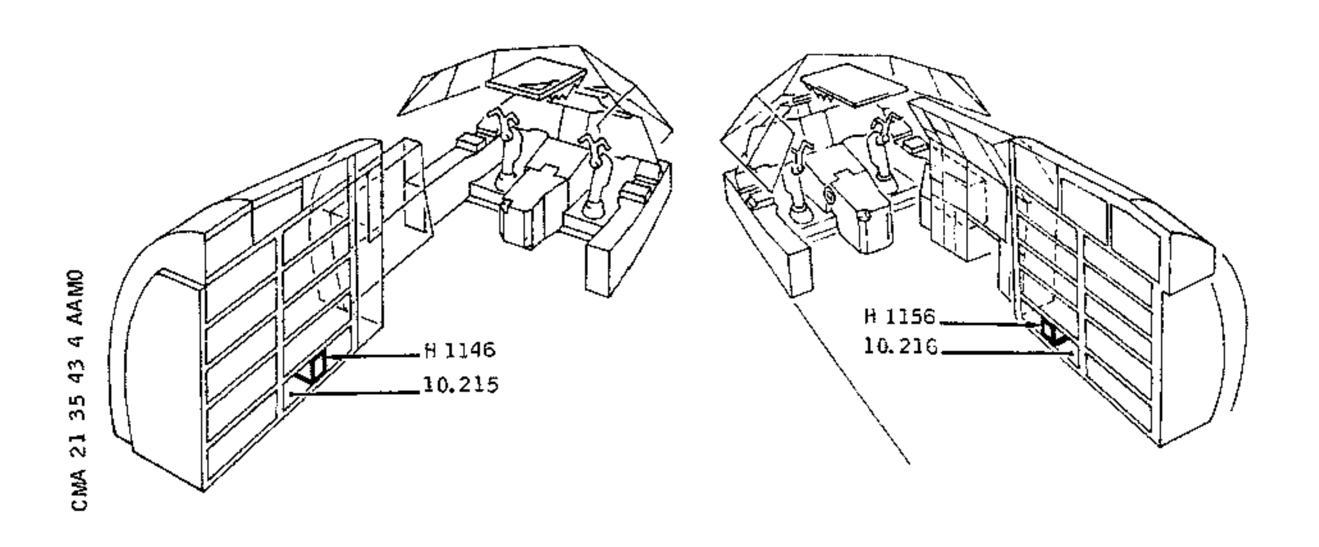
(1) On SYS 1 - SYS 2 pressure regulating selectors, bring back selected altitude to 0 ft.

R (2) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

1. General

A. The removal/installation procedure is identical for both amplifiers; only their location is different

2. Amplifier (Ref. Fig. 401)



Amplifier Location
Figure 401

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	

B. Prepare

(1) On electronics racks, open the appropriate panel :

Zone 10-215 for system 1 amplifier
Zone 10-216 for system 2 amplifier

(2) Trip, safety and tag the following circuit breaker

(a) for system 1 amplifier

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SYST 1 PRESSN CONT & SUP	2-213	H1122	H16

(b) for system 2 amplifier

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SYST 2 PRESSN CONT & SUP	2-213	H1159	H15

C. Remove

(1) Unscrew both attaching nuts until they are out of the tab

(2) Move both screw and nut assemblies downwards

(3) Disconnect pressure connector couplings

(4) Pull amplifier; hold it to prevent it from falling when it is out of the rack

D. Preparation of Replacement Component

(1) Remove screws used for transportation from the replacement amplifier

(2) Check electrical connector (rack side and amplifier side) for condition

(3) Check that the amplifier bears no evidence of dents or traces of corrosion

E. Install

(1) Install amplifier at its location

(2) Lift both screw and nut assemblies and screw the lat-

ter in tab on front face of amplifier

(3) Fully tighten nuts.

(4) Connect pressure connector couplings

F. Test

Ref. 21-35-43, Adjustment/Test.

G. Close Up

(1) Remove safety clips and tags and reset the following circuit breaker

(a) for system 1 amplifier

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SYST 1 PRESSN CONT & SUP	2-213	H1122	H16

(b) for system 2 amplifier

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SYST 2 PRESSN CONT & SUP	2-213	H1159	H15

(2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment

(3) On electronics racks close the appropriate panel :

Zone 10-215 for system 1 amplifier
Zone 10-216 for system 2 amplifier

AMPLIFIER - ADJUSTMENT/TEST

1. General

Check of cabin pressure control system operation after replacement of system 1 or system 2 amplifier.

NOTE : The two pressure control systems are identical, and this test procedure deals with system 1. The identifiers between brackets refer to system 2.

2. Operational Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Circuit Breaker Safety Clips	

B. Prepare

(1) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SYS 2 FWD AFT DISCHARGE VALVE SUP	1-213	H1124	E13
LH U/C WEIGHT SW "A" SYS SUP		G 292	M17
RH U/C WEIGHT SW "A" SYS SUP		G 295	M18
SYS 2 VAC PUMP SUP FWD FAN AUTO CONT	2-213	H1123	A16
SYS 2 DISCH VALVE POSN IND		H1129	A17
SYS 1 VAC PUMP SUP FWD AUTO CONT		H1127	G17
SYS 2 PRESSN CONT SUP		H1159	H15
SYS 1 PRESSN CONT SUP		H1122	H16
SYS 1 DISCH VALVE POSN IND		H1128	H17

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW "B" SYS SUP	3-213	G 293	B 8
RH UC WEIGHT SW "B" SYS SUP		G 294	B 9
SYS 1 FWD AFT DISCHARGE VALVE SUP	5-213	H1125	E 8
SYS 1 GRD PRESSN CONT	15-215	H1157	E 3
SYS 2 GRD PRESSN CONT	15-216	H1158	D23

(2) On Flight Engineer's CABIN PRESSURE CONTROL panel, make certain that :

(a) SHUT 1 - AUTO - SHUT 2 switch is in AUTO position.

(b) SYS 1 - SYS 2 DISCHARGE VALVES switches are in NORM position.

(c) SYS 1 - SYS 2 DITCHING switches are in NORM position.

(d) EMERGY DEPRESS NORM TEST switch is in NORM position.

(e) An altitude of 0 ft is indicated on both cabin pressure regulating selectors (correct, if necessary, by means of knobs A).

(3) In flight compartment, on centre console, check that the 4 throttle control levers are in IDLE position.

(4) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
DEPRESSN MOTOR 1 SUP CONT IND	1-213	H1163	H12
DEPRESSN MOTOR 2 SUP CONT IND		H1164	H13

(5) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).
- On CABIN PRESSURE CONTROL panel, make certain that DISCHARGE VALVE POSIT indicator flags are not visible.

C. Test

(1) On CABIN PRESSURE CONTROL panel, place EMERGY DEPRESS NORM TEST switch in TEST position
R - On DISCHARGE VALVE POSIT indicator, the 4 valve posi-
R tion indicating tapes must be in SHUT position.

(2) Place SYS SELECT switch in SYS 1 (SYS 2) position.
- No effect.

(3) Trip, safety and tag circuit breaker G292 M17 panel 1-213.

(4) On system 1 pressure regulating selector located on left hand side of CABIN PRESSURE CONTROL panel (right hand side for system 2):

(a) Select an altitude of + 10,000 ft by means of knob A
- On DISCHARGE VALVE POSIT indicator SYS 1 valve position indicating tapes must be in OPEN position, SYS 2 tapes must remain in SHUT position (OPEN position in system 2, SHUT position in system 1).

(b) Select an altitude of - 5,000 ft :
- On DISCHARGE VALVE POSIT indicator, SYS 1 valve position indicating tapes must be in SHUT position, SYS 2 tapes must remain in SHUT position (or SHUT position in SYS 2, SHUT position in SYS 1).

(5) Remove safety clip and tag, and set circuit breaker G292, M17 panel 1-213.

(6) Place GRND TEST switch in NORM position
- The SYS 1 and SYS 2 valve position indicating tape must be in OPEN position (OPEN, SYS 2 and SYS 1) as a result of these two operations.

(7) On centre console, place one of the four throttle control levers in MAX THRUST position
- On DISCHARGE VALVE POSIT indicator, SYS 1 and SYS 2
R valve position indicating tapes must be in SHUT

position.

(8) Place SYS SELECT switches in SYS 2 (SYS 1) position
- On DISCHARGE VALVE POSIT indicator, the results must be the same as in (7).

(9) Place SYS SELECT switches in their initial position
- No effect.

(10) Return throttle control levers to IDLE position : On DISCHARGE VALVE POSIT indicator, SYS 1 and SYS 2 valve position indicators must be in OPEN position.

D. Close-Up

(1) Select 0 ft on system 1 and 2 cabin pressure regulating selectors.

(2) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(3) Remove safety clips and tags and reset the circuit breakers tripped in paragraph B (4).

REGULATING AND SAFETY VALVE POSITION INDICATOR REMOVAL/INSTALLATION

1. General

   A. The regulating and safety valve position indicator H1147 is mounted on CABIN PRESSURE CONTROL Flight Engineer's panel

2. Regulating and Safety Valve Position Indicator (Ref. Fig. 401)

   A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Circuit Breaker Safety Clips	

   B. Prepare

      (1) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SYS1 DISCH VALVE POSN IND	2-213	H1128	H17
SYS2 DISCH VALVE POSN IND		H1129	H17

   C. Remove

      (1) Unscrew the 4 screws securing indicator on panel.

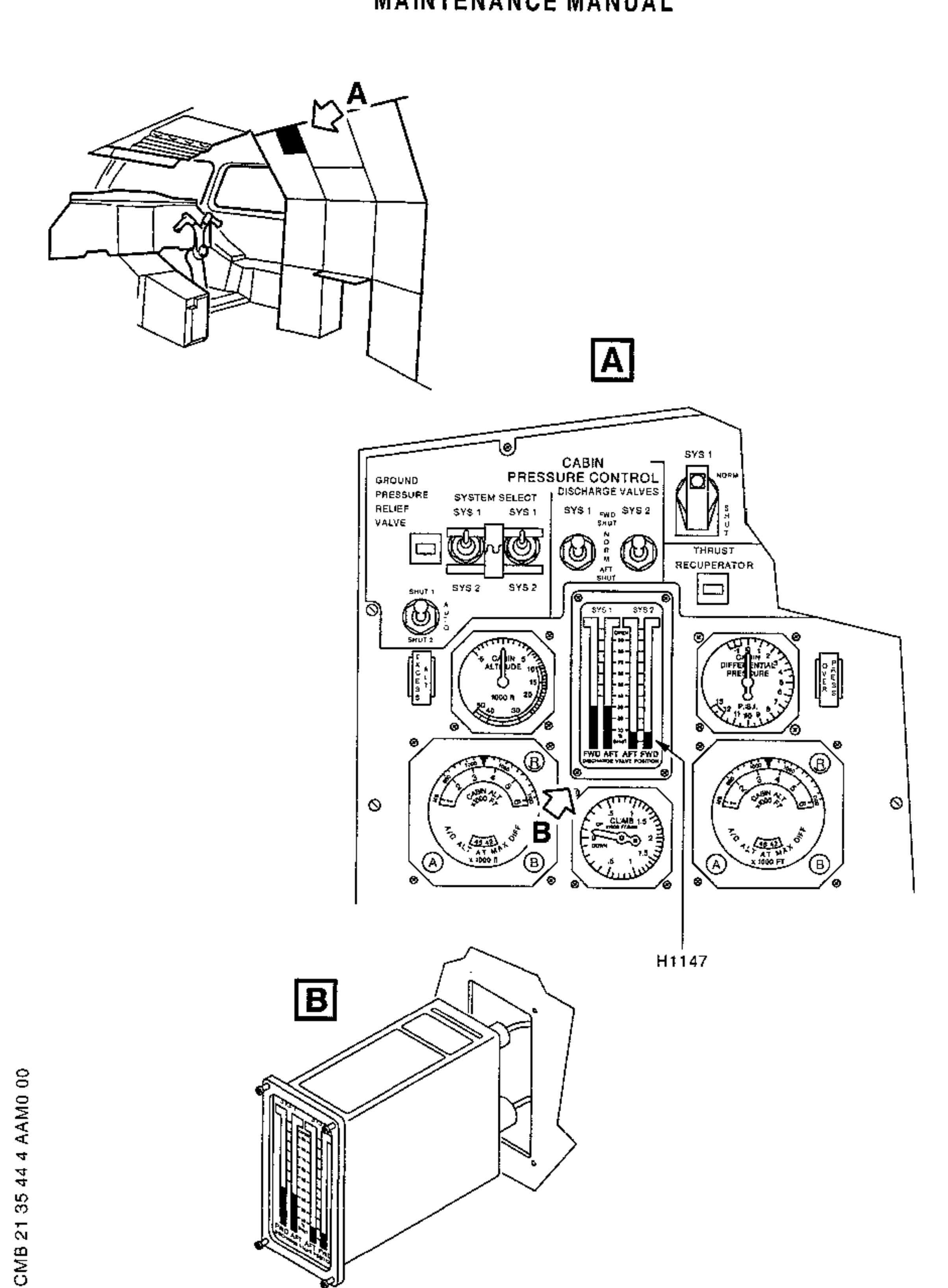
      (2) Disconnect plugs H1147A and 1147B from regulating and safety valve position indicator (H1147).

      (3) Remove indicator.

   D. Preparation of Replacement Component

      (1) Check indicator for evidence of dents, scratched paint, etc...

      (2) Remove protective caps from electrical connectors, make certain that pins are not damaged.



Location of Valve Position Indicator
Figure 401

E. Install

(1) Connect plug H1147A to corresponding indicator receptacle.

(2) Connect plug H1147B to corresponding indicator receptacle.

NOTE : A locating pin ensures correct matching of connectors.

(3) Install indicator on panel, tighten the 4 securing screws.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

F. Test

(1) Reset the circuit breakers tripped in paragraph B (1).

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

- On CABIN PRESSURE CONTROL Flight Engineer's panel on valve position indicator, the 4 flags must disappear, the 4 valve position indicating tapes must display OPEN.

(3) On CABIN PRESSURE CONTROL panel, place SYS1 and SYS2 switches in FWD SHUT position.

- On valve position indicator the valve position indicating tapes SYS1 FWD and SYS2 FWD must display SHUT.

(4) Place above mentioned switches in NORM then in AFT SHUT position.

- On valve position indicator the valve position indicating tapes SYS1 FWD and SYS2 FWD must display OPEN.
- The valve position indicating tapes SYS1 AFT and SYS2 AFT must display SHUT.

(5) Place SYS1 and SYS2 switches in NORM position.

- The 4 valve position indicating tapes must display OPEN.

G. Close-Up

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

CABIN ALTIMETER - REMOVAL/INSTALLATION

1. General

A. Captain's cabin altimeter (D193) is installed as follows :
Pre Mod CM 42520 - On Captain's instrument panel 2-211.
Post Mod CM 42520 - On centre console panel 7-211.

B. Flight Engineer's cabin altimeter (D191) is installed on Flight Engineer's CABIN PRESSURE CONTROL panel.

2. Captain's Cabin Altimeter (D193)
(Ref. Fig.401 and 402)

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clip	

B. Prepare

(1) On panel 12-211 make certain that LH DASH INSTRUMENTS selector switch is in OFF position.

(2) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH DASH INST LTS SUP	13-215	L 372	A12

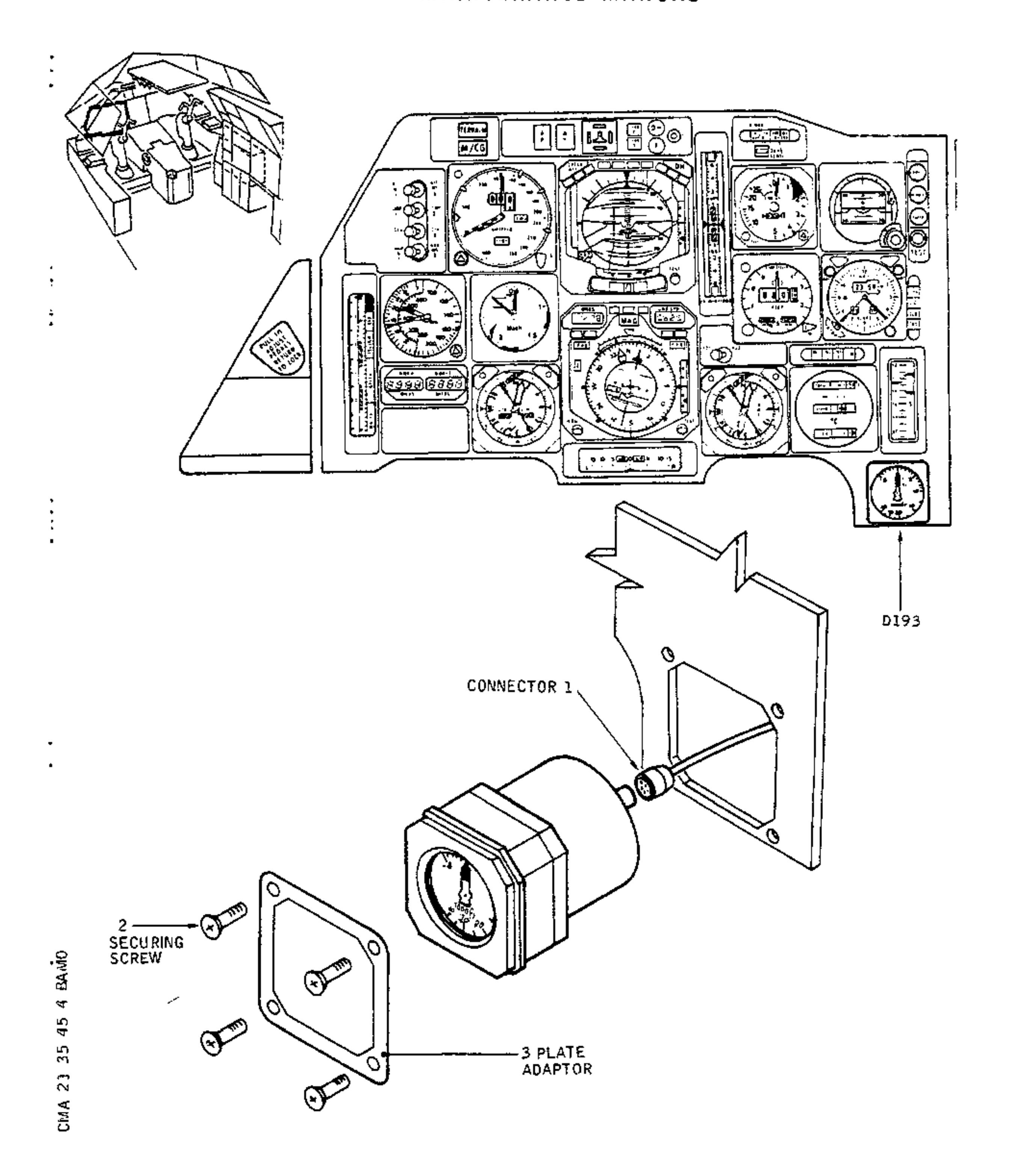
C. Remove

(1) On instrument panel 2-211 or 7-211, remove the 4 screws (2) securing cabin altimeter and retain plate adaptor (3).

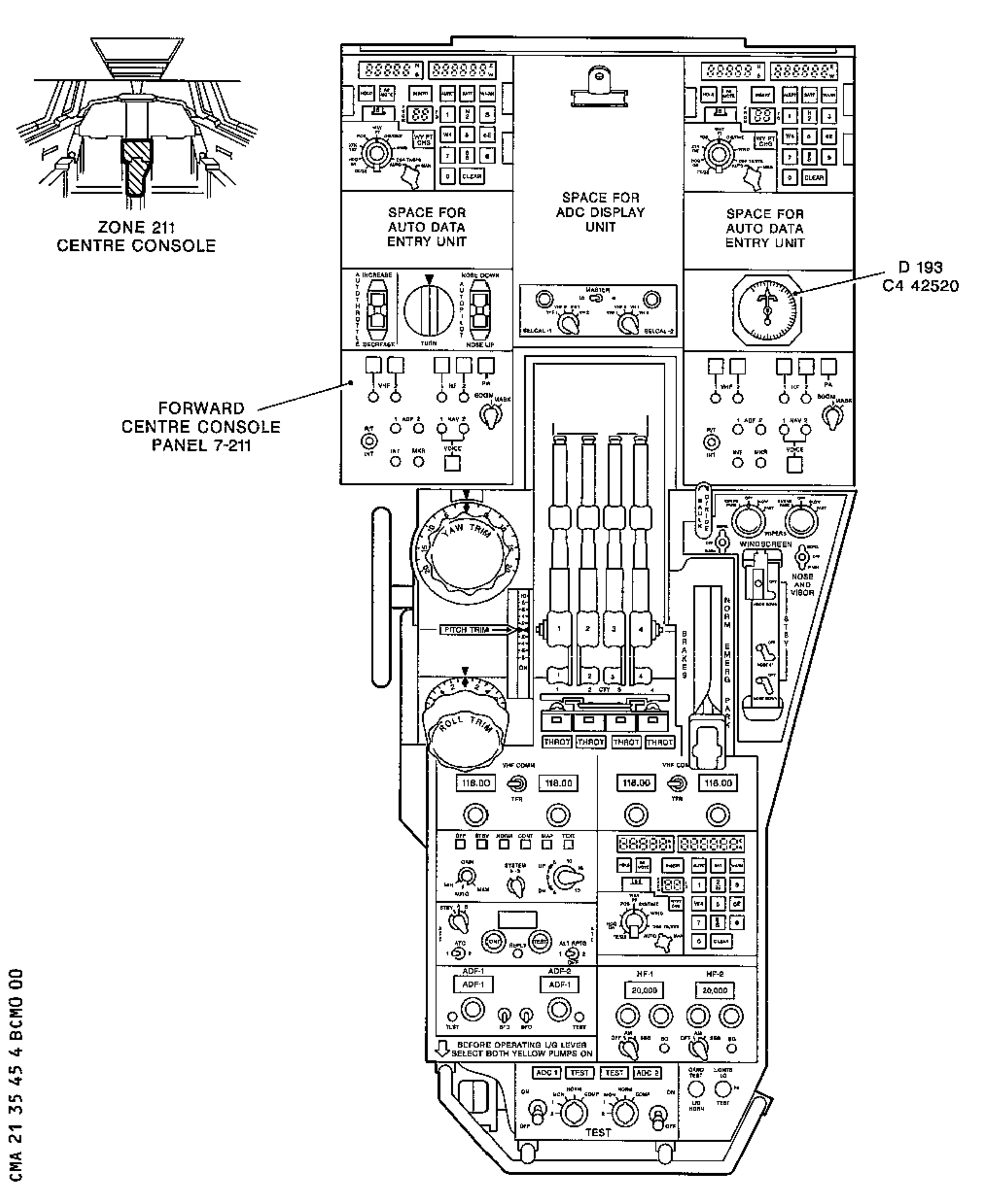
(2) Carefully pull cabin altimeter forward as far as cable allows.

(3) Disconnect electrical connector D193A (1) and remove the altimeter.

D. Preparation of Replacement Component.



Location of Captain's Altimeter
Figure 401



Location of Captain's Altimeter/Centre Console
Figure 402

(1) Make certain that the altimeter bears no dents, scratched paint etc.

(2) Remove blanking caps from electrical connector and pressure static ports.

(3) Make certain that pins are not bent or damaged.

E. Install

(1) Offer up cabin altimeter to panel aperture ; connect electrical connector D193 (1).

(2) Install altimeter on panel. Install plate adaptor (3).

(3) Install and tighten the 4 screws (2) securing altimeter on panel.

F. Close-Up

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(1) Remove safety clip and tag and reset circuit breaker tripped in paragraph B (2).

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(3) On panel 12-211, rotate LH DASH INSTRUMENTS selector switch clockwise and make certain that cabin altimeter is illuminated.

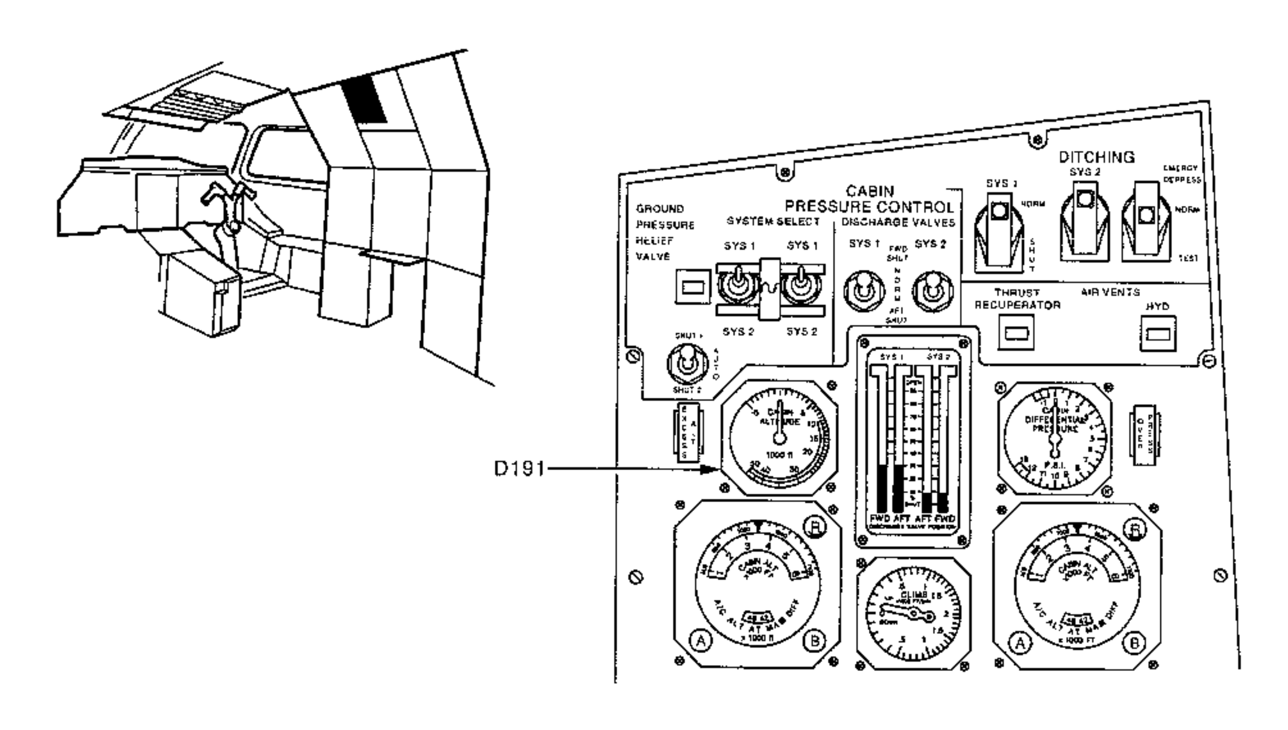
(4) On panel 12-211, place LH DASH INSTRUMENTS in OFF position and make certain that cabin altimeter is no longer illuminated.

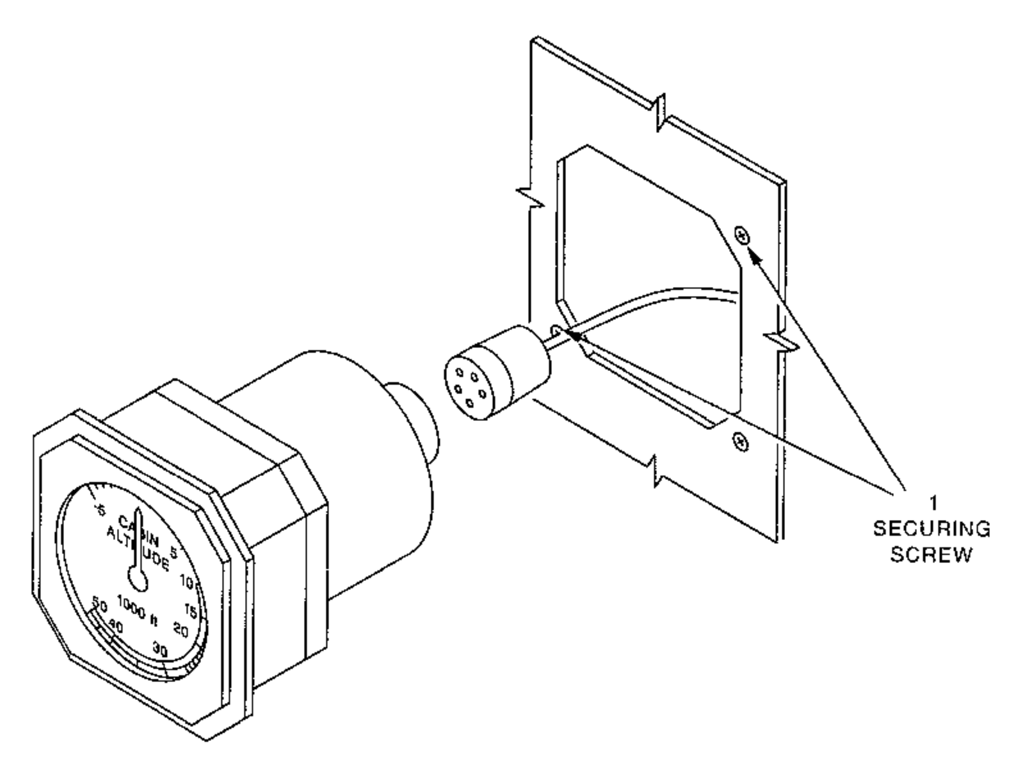
(5) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

3. Flight Engineer's Cabin Altimeter D191 (Ref. Fig. 403)

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clip	





Location of Flight Engineer´s Altimeter
Figure 403

B. Prepare

(1) On Flight Engineer's panel, make certain that LIGHTING PANEL selector switch is in OFF position.

(2) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
3CM STN INST LTS SUP	13-216	L 377	L16

C. Remove

(1) At Flight Engineer's station, on CABIN PRESSURE CONTROL panel, remove both securing screws (1) from cabin altimeter.

(2) Carefully pull cabin altimeter forward as far as cable allows.

(3) Disconnect electrical connector from cabin altimeter.

(4) Remove cabin altimeter.

D. Preparation of Replacement Component

(1) Make certain that the instrument bears no dent, scratched paint, etc.

(2) Remove blanking caps from electrical connector and pressure ports.

(3) Make certain that pins are not bent or damaged.

R E. Install

R (1) Connect aircraft system electrical connector to cabin
R altimeter.

R (2) Install altimeter on panel ; make certain that cables
R are not caught.

R (3) Install and tighten both securing screws (1).

R F. Close-Up

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(1) Remove safety clip and tag and reset the circuit breaker tripped in paragraph B (2).

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(3) On Flight Engineer's panel, rotate LIGHTING PANEL selector switch clockwise and check that cabin altimeter is illuminated.

(4) On Flight Engineer's panel, place LIGHTING PANEL selector switch in OFF position and check that cabin altimeter is no longer illuminated.

(5) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

CABIN DIFFERENTIAL PRESSURE INDICATOR - REMOVAL/INSTALLATION

1. General

The cabin differential pressure indicator (D194) is installed on Flight Engineer's CABIN PRESSURE CONTROL panel 1-214.

2. Cabin Differential Pressure Indicator
(Ref. Fig. 401)

A. Equipment and Materials

DESCRIPTION	PART NO.
Blanking plug	

B. Remove

(1) On front face of CABIN PRESSURE CONTROL panel, remove the 2 securing screws while holding the indicator with one hand.

(2) Carefully pull indicator.

(3) Disconnect static pressure port hose from the indicator.

(4) Cap hose end.

(5) Disconnect electrical connector (D194A) from indicator.

C. Preparation of Replacement Component

(1) Make certain that the instrument bears no dents, scratched paint etc.

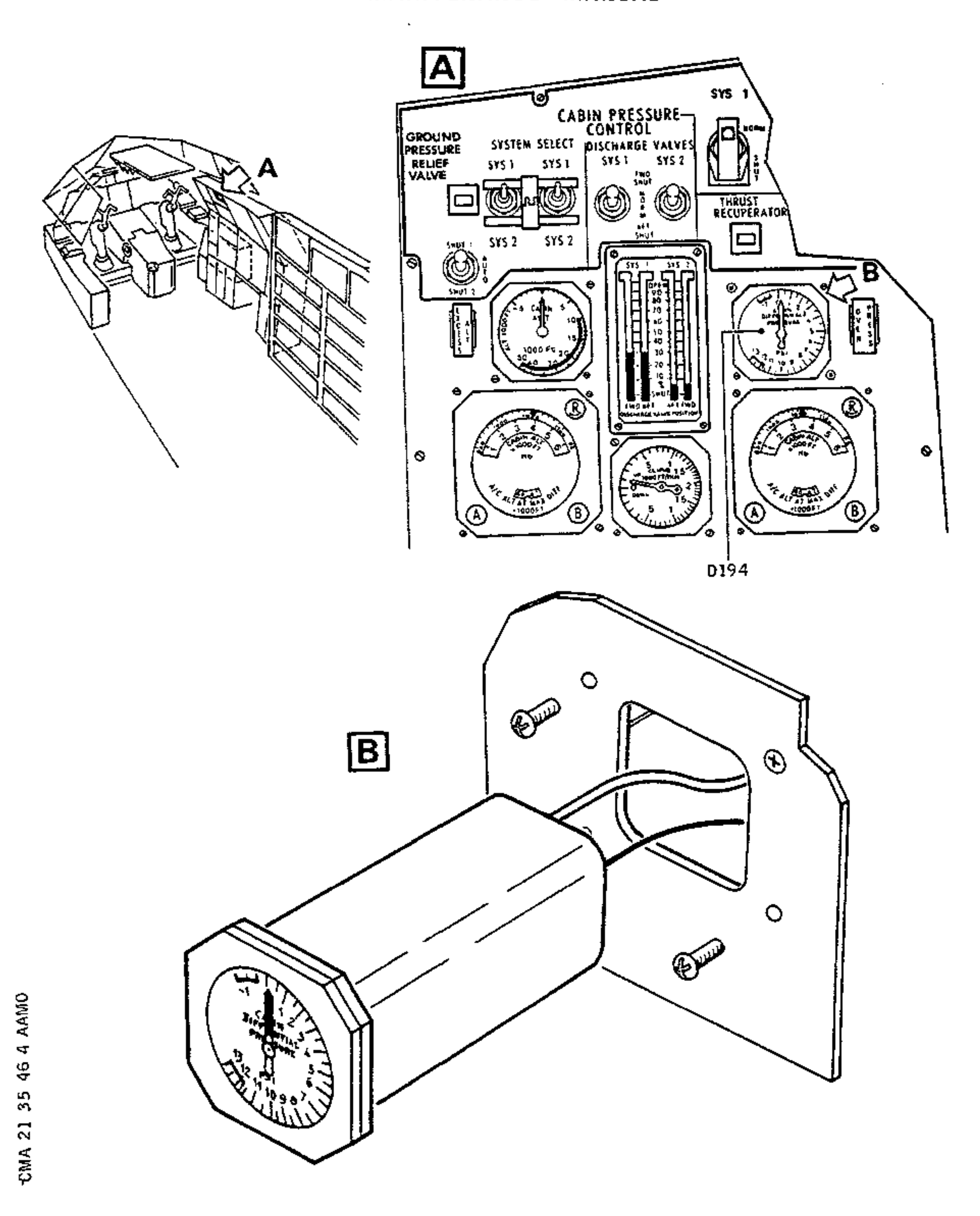
(2) Remove protective plugs from electrical connector and pressure ports (cabin pressure and static pressure). Make certain that pins are not damaged or bent.

D. Install

(1) Remove blanking cap from static port hose end.

(2) Connect hose to the indicator.

(3) Connect electrical connector D194A to the indicator.



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Location of Cabin Differential
Pressure Indicator
Figure 401

(4) Position the indicator on the panel, tighten the 2 securing screws.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

RATE OF CLIMB INDICATOR - REMOVAL/INSTALLATION

1. General

A. The rate of climb indicator (D192) is installed on Flight Engineer's CABIN PRESSURE CONTROL panel.

2. Rate of Climb Indicator (D192)
(Ref. Fig. 401)

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clip	

B. Prepare

(1) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
3 CM STN INST LTS SUP	13-216	L 377	L16

C. Remove

(1) On Flight Engineer's CABIN PRESSURE CONTROL panel remove both securing screws from indicator.

(2) Carefully pull out indicator to remove electrical connector.

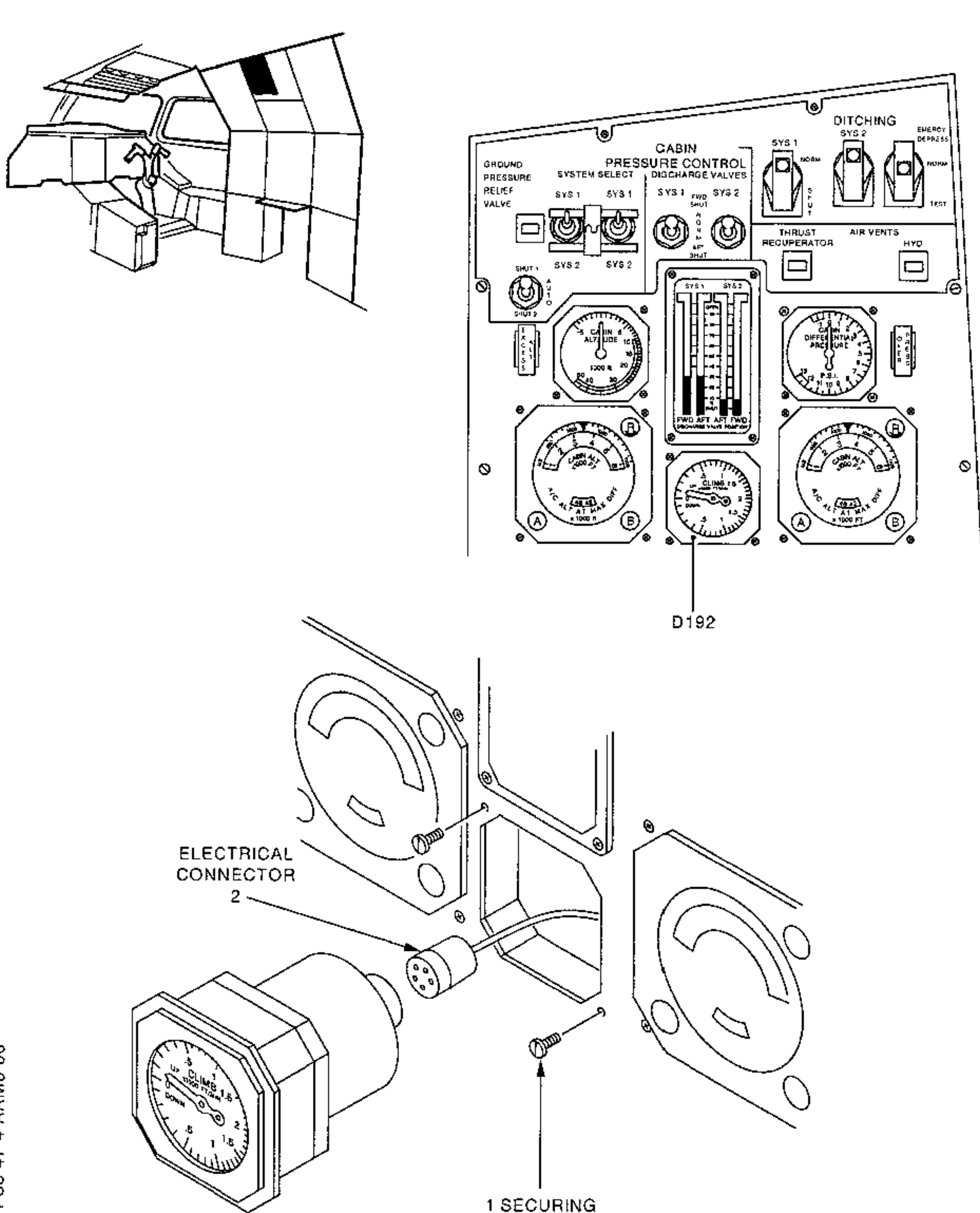
(3) Disconnect electrical connector (2).

(4) Remove indicator.

D. Preparation of Replacement Component

(1) Make certain that the instrument bears no dents, scratched paint etc.

(2) Remove protective plugs from electrical connector, and from pressure port.
Make certain that the pins are not bent or damaged.



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Location of Rate of Climb Indicator
Figure 401

E. Install

(1) Connect electrical connector (2) to rate of climb indicator.

(2) Install indicator on panel ; make certain that electrical cables are not caught.

(3) Screw and tighten both screws (1) securing indicator to panel.

F. Close-Up

(1) Reset the circuit breaker tripped in paragraph B (1).

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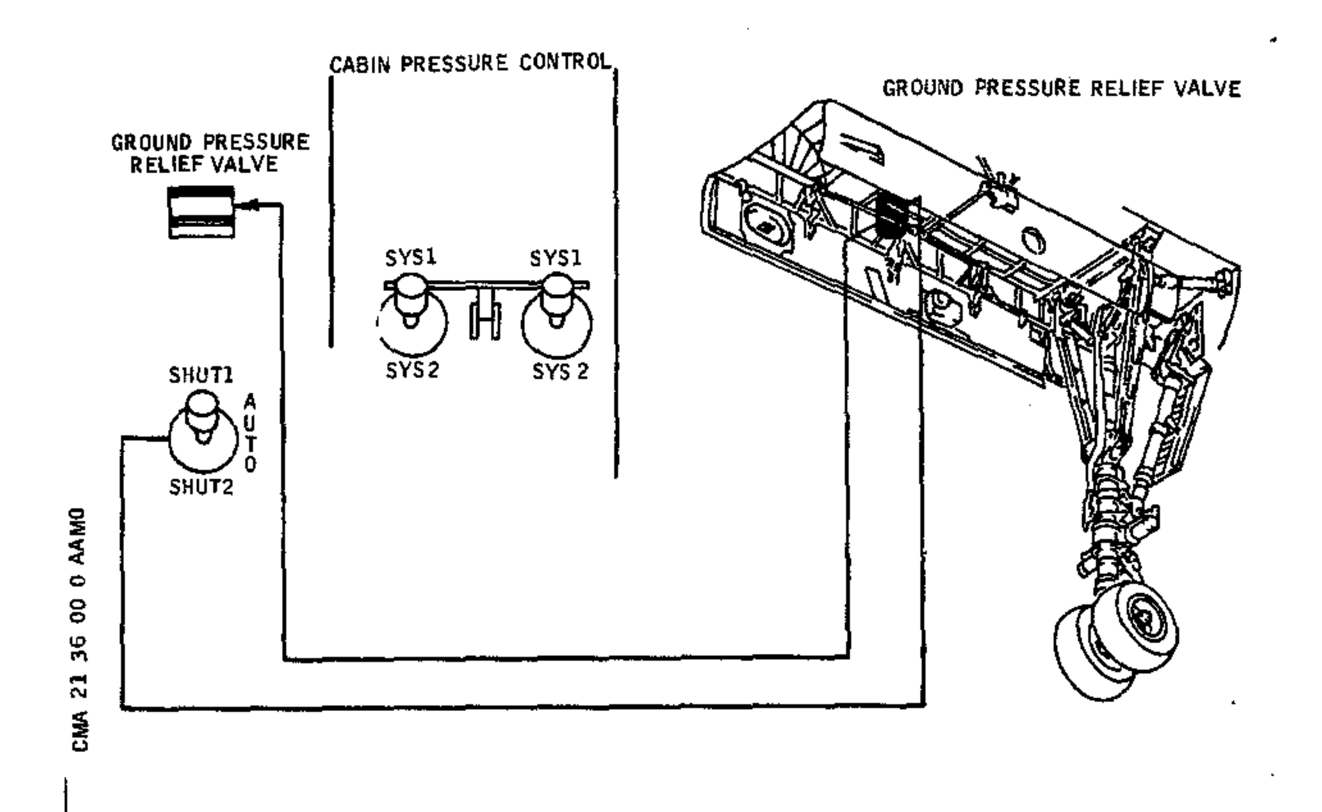
DEPRESSURIZING ON GROUND - DESCRIPTION AND OPERATION

1. General

The ground pressure relief valve prevents the fuselage from being in excessive pressure condition when the ground air conditioning unit is connected to the aircraft and doors are closed.
It also prevents the fuselage from being in underpressure condition when doors are closed and avionics racks extractor
R fans operate.

2. Description (Ref. Fig. 001)

The ground pressure relief valve is located between frames 20 and 21 on the RH side. It is installed under the pressurized floor and discharges into the nose gear well. Its indicating system and control switch are located on CABIN PRESSURE CONTROL panel.



Depressurizing on Ground
Figure 001

3. Ground Pressure Relief Valve

The valve is a butterfly type valve, the butterfly controlled by an assembly consisting of two electric motors and associated gear.
Accidental opening of the valve when cabin differential pressure is equal to 100 mbars is prevented by a mechanical locking system inside the valve.

A. Control Assembly Operation (Ref. Fig. 002)

(1) Principle of operation

Principle of operation of double actuator is based upon reduction of rotation speed of two motors (1A) and (1B) by means of a mechanical reduction gear system (ratio 1/7850).

Motors (1A) and (1B) each have an independent electrical supply.

The last stage of each reduction gear group operates a control assembly (13) equipped with two arms which, following the case (opening or closing), rotate at a given angle between two electric stops. The stops determine direction of rotation and ensure control of the motors.

(2) Detailed operation

Rotation speed of motors (1A) and (1B) is reduced through wheel (2) and planetary gear pinion of declutching sub-assembly then, in a given ratio, through each one of the successive planet pinion supports constituting the reduction gear groups. The last stage of each group operates the control assembly jointly through pinions (10) and (10A).

(3) Mechanical operation

The 27 VDC motors (1A) and (1B) drive independently wheel (2) of declutching sub-assembly. The planetary gear pinion of declutching sub-assembly, meshes with the three planet pinions (3) of the planet pinion support sub-assembly (4). Planet pinions (3) rotate around fixed ring gear, thus causing rotation of planet pinion support sub-assembly (4). Planetary gear of planet pinion support sub-assembly (4) meshes in turn with planet pinions (5) and so on until last stage where planet pinions (9) are driving pinion (10), and pinion (10A) at the speed requested by each reduction gear

R group.

R (4) With motor (1A) in operation, pinion (10) meshes with central gear (11) driving planet pinions (12) of control assembly operating inside ring gear (11), which initiates rotation of control (13).

R (5) With second motor (1B) in operation, pin (10A) meshes with ring gear (11A) thus increasing ring gear rotation and control (13) speed.

R (6) Finally if one of the motors has a defective electrical supply, control (13) is operated either by central gear (11) through drive from pinion (10), (ring gear (11A) being stationary) or by ring gear (11A), through drive from pin (10A), (central gear (11) being stationary).

R Thus, with only one motor in operation, control (13) rotates 90° in approximately 10 to 14 seconds.

R With both motors in operation, control (13) rotates 90° in approximately 5 to 7 seconds.

R Control (13) is provided with an arm, the rotation of which stops electrical supply to motors (1A) and (1B) A mechanical stop on the valve is protected by the declutching sub-assembly. When the mechanical stop is reached, the declutching sub-assembly absorbs motor inertia : declutching torque value being reached, wheel (2) is still rotated by the motor, but planetary gear of declutching sub-assembly remains stationary.

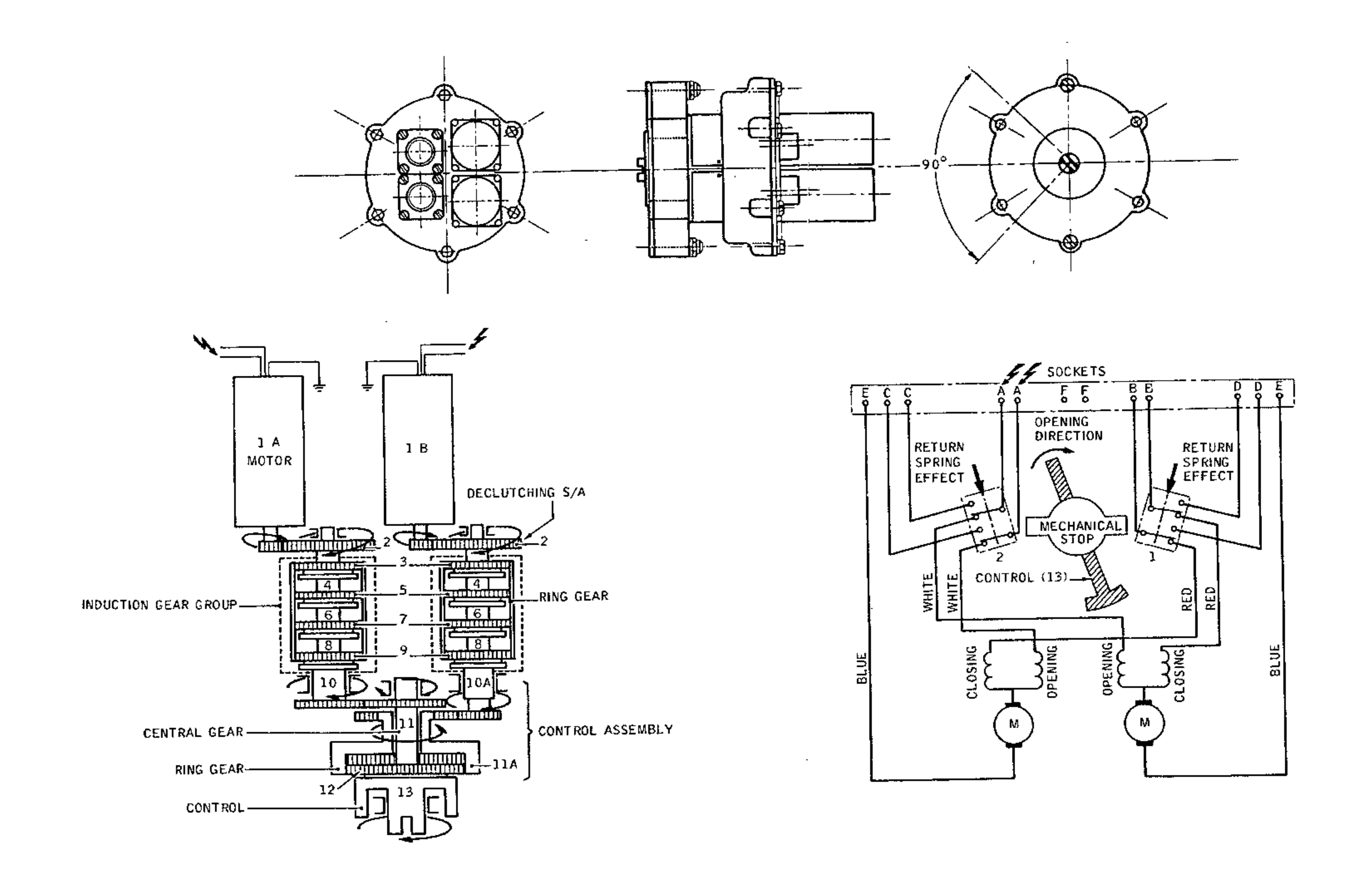
R (7) Electrical operation

R At start of opening sequence the clevis controlled by control arm (13) moves away from microswitches (1) which return to rest position and subsequently initiate closing sequence when B circuit is energized. At end of opening sequence control arm (13) clevis operates microswitches (2) cutting off power supply to motors. At start of closing sequence, when B circuit is energized, clevis moves away from microswitches (2) which return to rest position, and this subsequently permits valve opening sequence when circuit A is energized.

R At end of closing sequence, control arm (13) clevis operates microswitches (1), shutting off power supply power supply to motors.

R NOTE : Each microswitch group ensures both motors operation control and pump position indication.

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R

Control Assembly
Figure 002

R B. Mechanical Locking Operation (Ref. Fig. 003)

R Cabin pressure is admitted into chamber B. Chamber A con-
R tains external air pressure. When the pressure differential
R between chamber B and chamber A has reached $80 ^{+20}_{-0}$ m.bars
R
R the spring is compressed and the locking stud (1) locks the
R valve butterfly in position. When pressure in chamber B
R decreases and becomes effectively equal to the pressure in
R chamber A spring action disengages the locking stud (1) and
R frees the butterfly.

4. Operation

The Ground Pressure relief valve is electrically operated. A mechanical locking system inside the valve prohibits any accidental opening when the cabin differential pressure is equal to 100 mbars.

A. Automatic Operation (Ref. Fig.004 and 005)

Control switch H1165 in AUTO position.
Aircraft on the ground.
Throttle control lever in any position except maximum rate.
Relays H1166 and H1170 are grounded through control switch H1165 when it is in AUTO position.
Indicating, control and switching relay H1166 supplies
R power to relay 1170 and to motor 1.

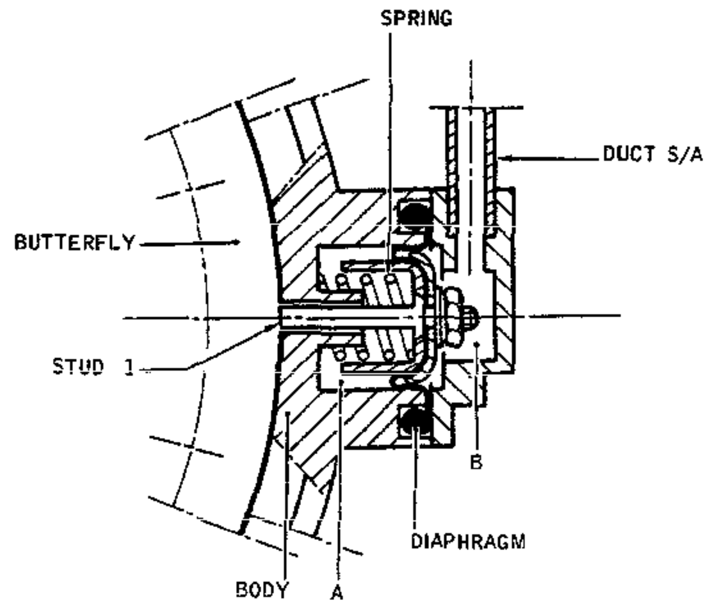
The 45 seconds closure delayed relay H1170 is energized and supplies power to motor 1 and 2 of ground pressure relief valve H1172 if :

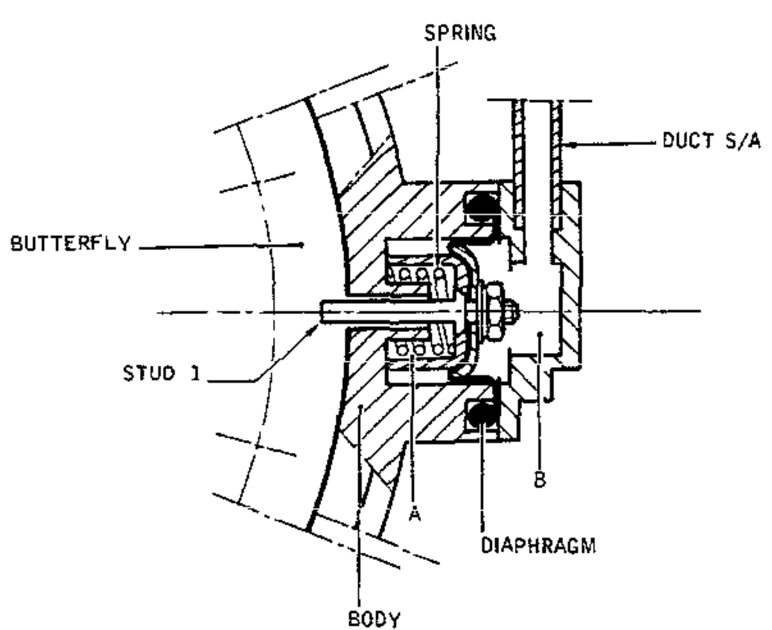
- RH gear shock absorber is compressed and LH shortening lock is locked.
- LH gear shock absorber is compressed and RH shortening lock is locked.
- Throttle control levers are in any position except maximum rate.

When the valve is at the end of its travel in the opening direction, the motors cause the end-of-travel microswitches to be switched, they move to the standby position and close the valve if necessary ; they supply power to the OPEN indicator light on CABIN PRESSURE CONTROL panel.

When one or several throttle control levers are switched to the maximum rate position :

- Relay H1175 is energized ; it causes relay H1170 ground
R connection to be cut out and energizes the 5 sec closure





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R Mechanical Locking Device
Figure 003

delayed relay H1169.
- When relay H1170 is not energized, it cuts out power supply to valve opening and to indicator light H1171.
- Relay H1169 energizes relay H1167 which supplies electrical current for ground pressure relief valve closing. When the ground pressure relief valve closes, the closing microswitches are switched and supply power to the indicator light ; they are in standby and capable of receiving and opening signal.

Aircraft in flight.
Control switch H1165 in AUTO position.
The ground pressure relief valve is closed.

When control switch H1165 is in AUTO position, relay H1165 is energized.
Relay H1169 is energized and energizes relay H1167 which supplies power to the two ground pressure relief valve motors ; microswitches are switched, they supply power to indicator light H1171, which displays SHUT.

At landing, with the throttle control levers in any position except maximum rate, relays G309 and G314 are energized when the landing gear shock absorbers are compressed and the shortening locks are locked.

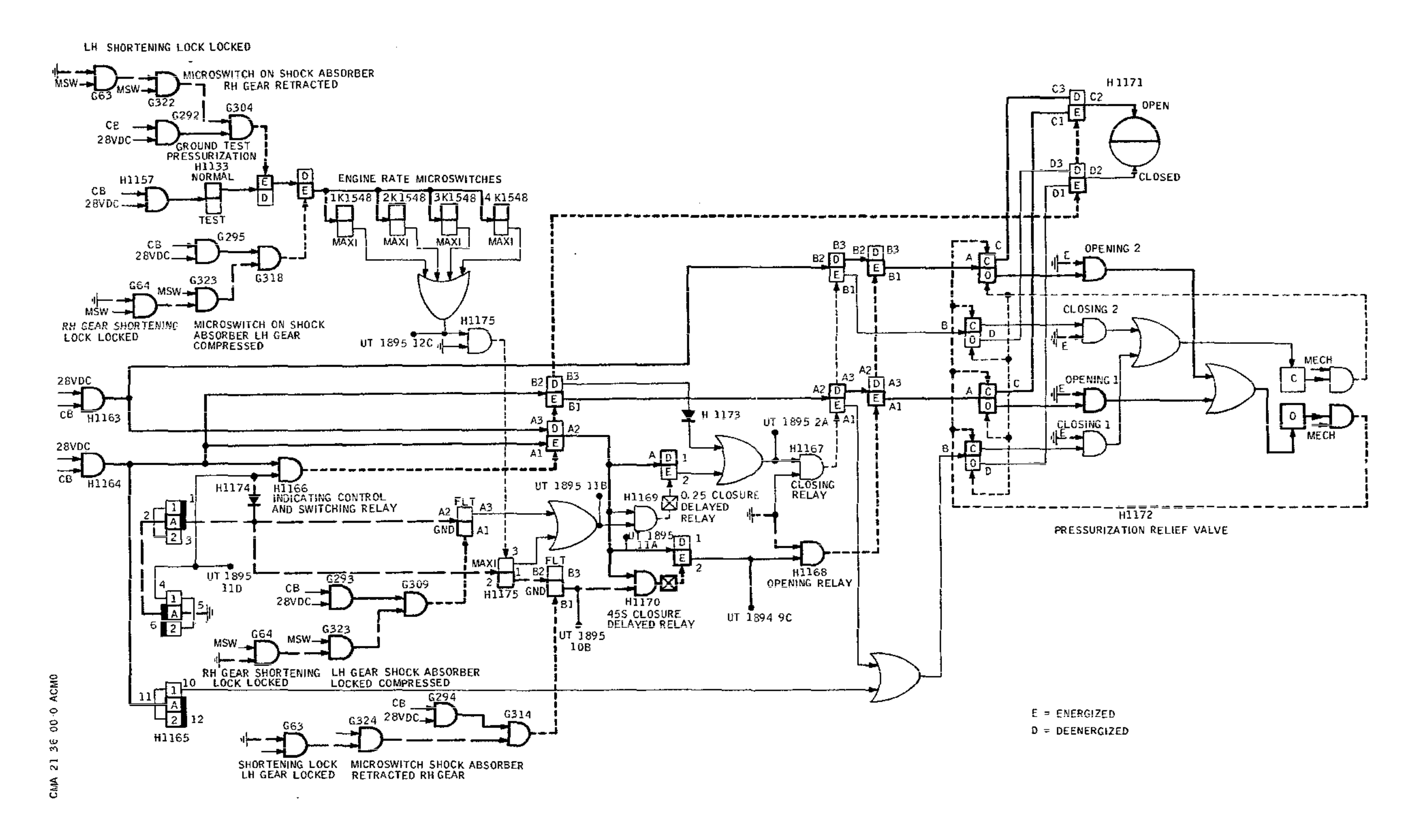
When relays G309 and G314 are energized they cut out power to relay H1169 and energize relay H1170.
When relay 1169 is not energized, it cuts out power supply to closing relay H1167.
When relay H1167 is not energized, it cuts out power to motors 1 and 2 to prohibit closure of the valve.
When relay H1170 is energized (closure delay 45 seconds) it energizes relay H1168.
It causes motors 1 and 2 to open the valve. At the end of the opening the microswitches allow indicator light H1171 to be electrically supplied ; it shows OPEN.
Microswitches are in standby and capable of receiving a closing signal.

B. Operation SHUT 1 and SHUT 2 (Ref. Fig. 006, 007 and 008) (Ref. Fig. 009)

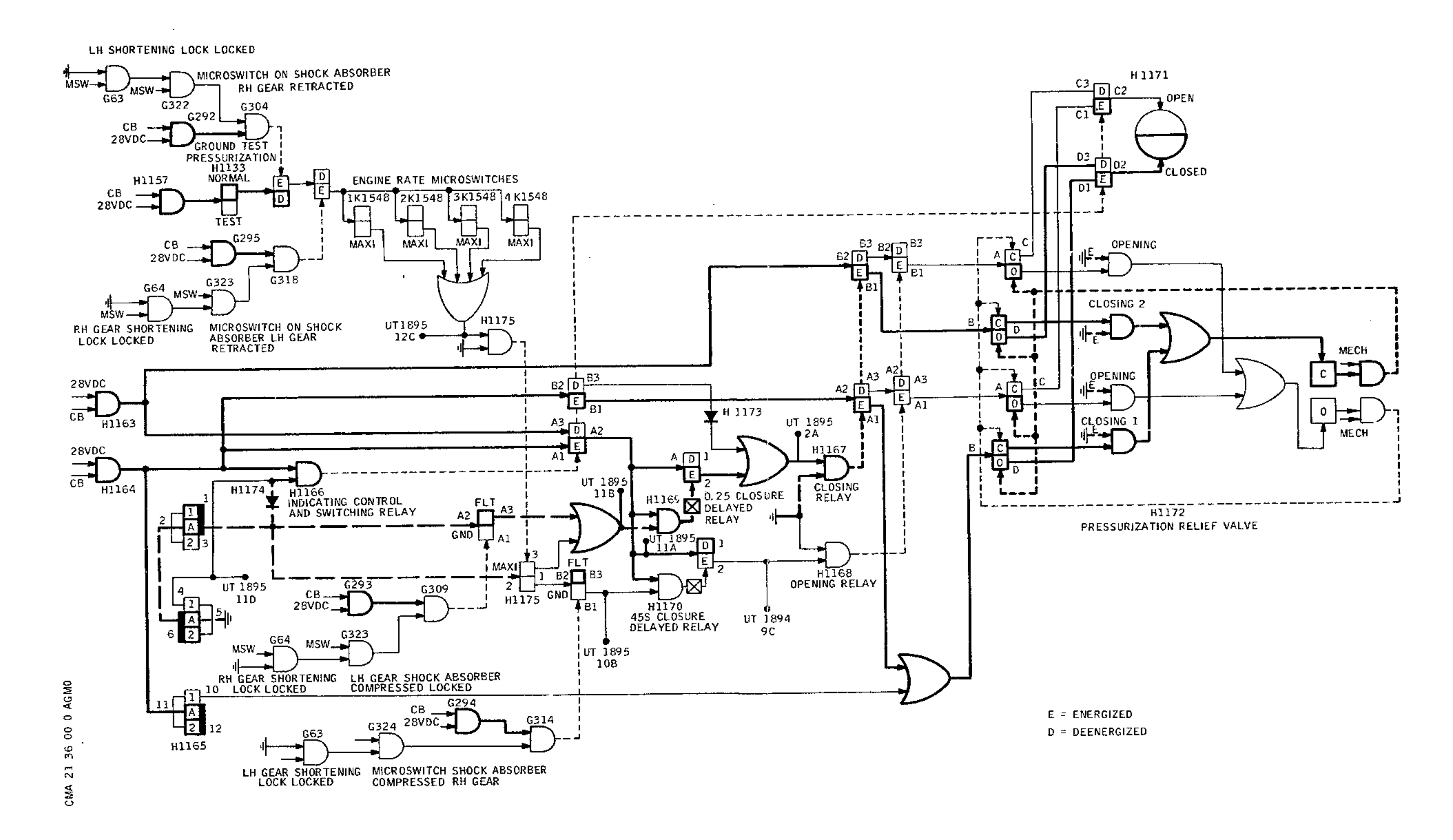
Control switch H1165 is in SHUT 1 position : Aircraft on the ground or in flight.

On the ground
Relay G314 is energized but does not act on relay 1H1170.
When throttle control lever is in full throttle position it energizes relay H1175 but does not act on valve control.
Relay H1166 is energized, relays H1169, H1170, H1167 are

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Depressurization - Aircraft on the Ground,
Valve Open, Control Switch in AUTO position
Figure 004



Depressurization - Aircraft in Flight -
Control Switch in AUTO position
Figure 005

not energized.

Motor 1 is directly supplied through the the third stage of control switch H1165.
On CABIN PRESSURE CONTROL panel indicator light H1171 shows SHUT when ground pressure relief valve is closed and when contacts have switched over.

In flight

Operation of ground pressure relief valve is the same.
Only relays H1175 and G314 cannot be energized.

Control switch H1165 is in SHUT 2 position.
Aircraft on the ground or in flight.

On the ground

When relay H1166 is not energized it supplies electrcial current to closing relay H1167.
When the latter is energized, it supplies power to motor 2 which causes the valve to close.
On CABIN PRESSURE CONTROL panel indicator light H1171 shows SHUT, when ground pressure relief valve is closed and when contacts have switched over.
On the ground, relay H1175 energized by throttle control lever in full throttle position or relays G314 and G309 energized when L/G shock absorber is compressed, do not prohibit valve closing.

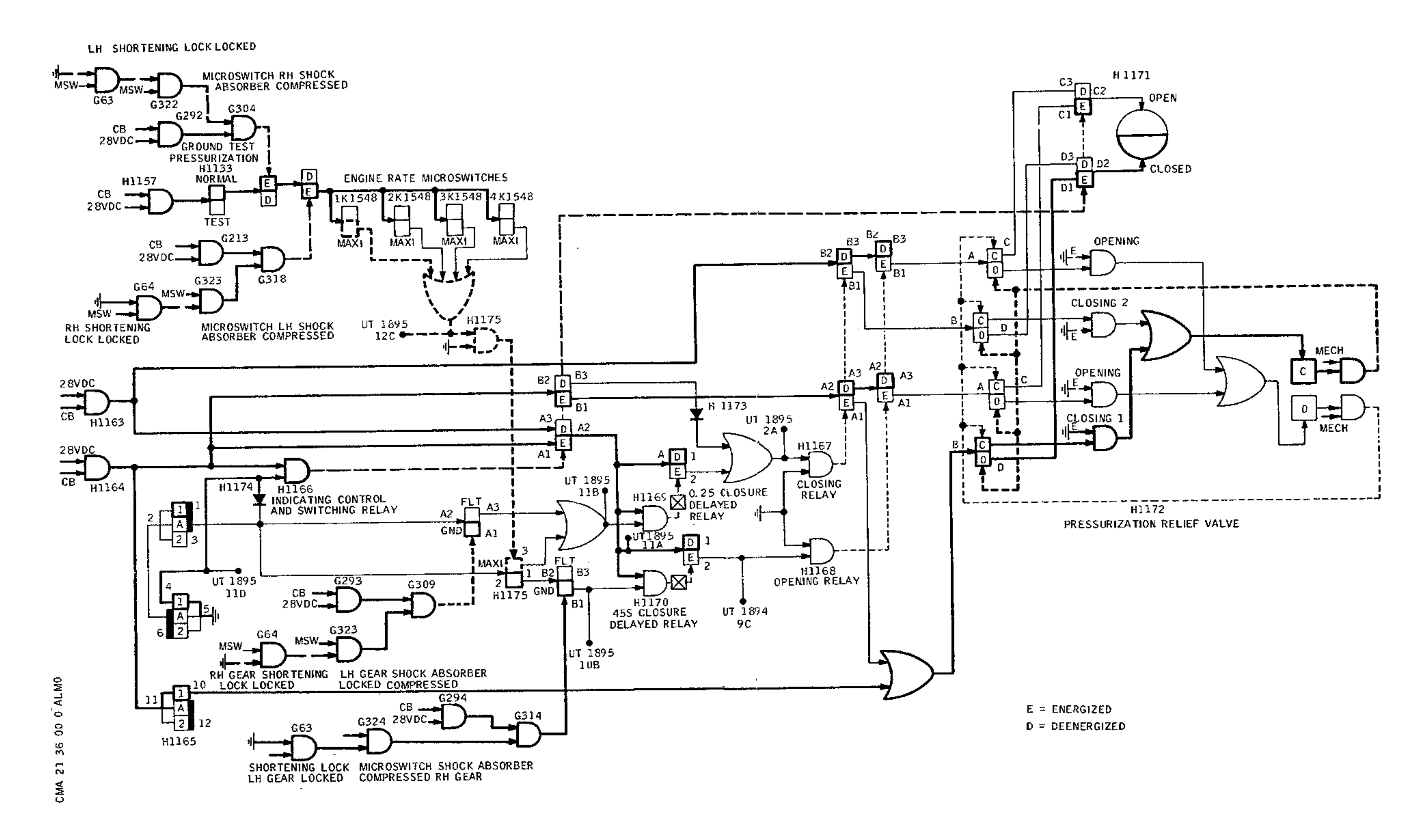
In flight

Same operation as on the ground.
Relays G315, G309 and H1175 do not change the valve operation.

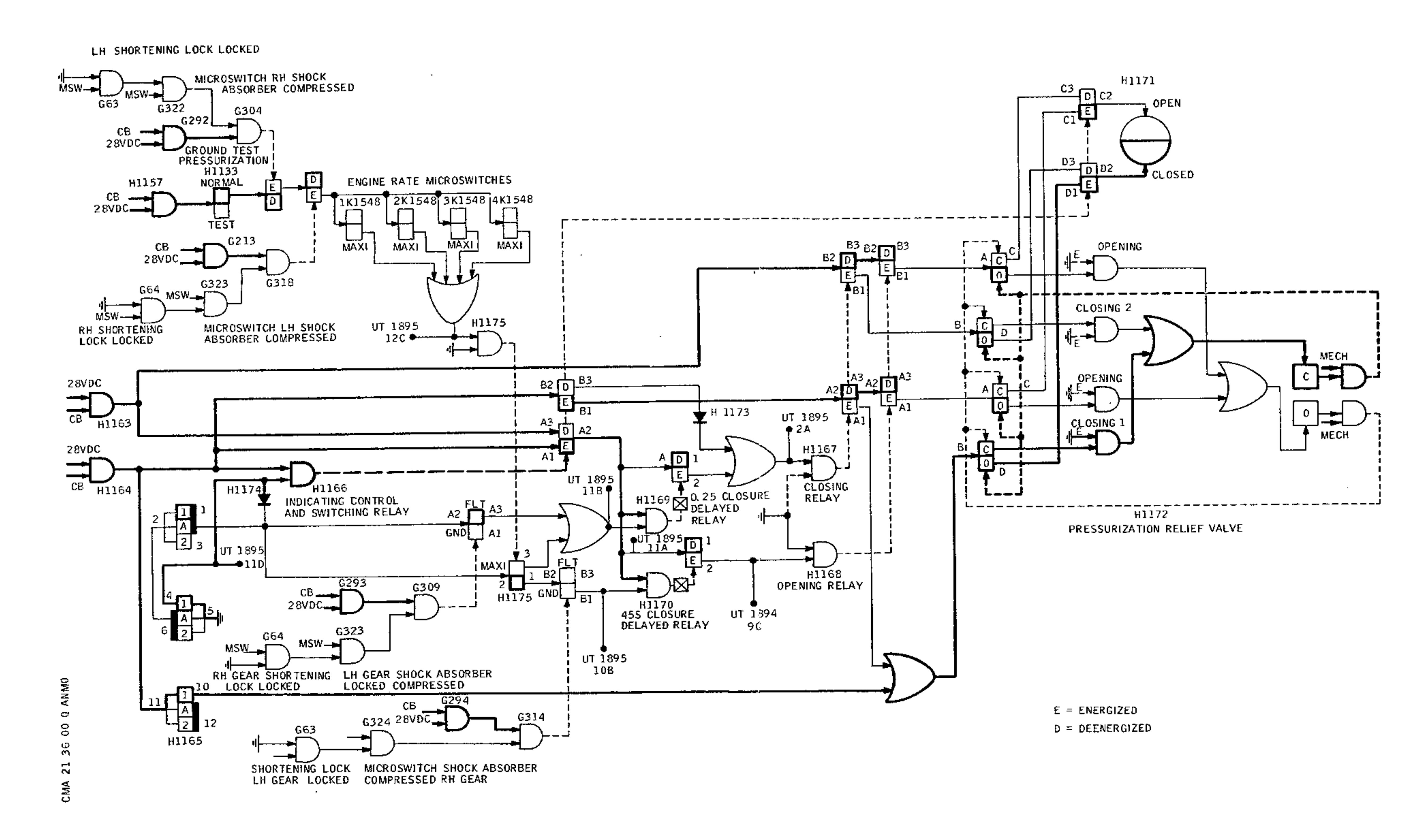
RB 5. Safety Valve

RB Two safety valves are located in the nose gear bay on the
RB discharge nozzles of the regulating and safety valves. They
RB limit bay pressure should the ground pressure relief valve stay
RB open in flight.

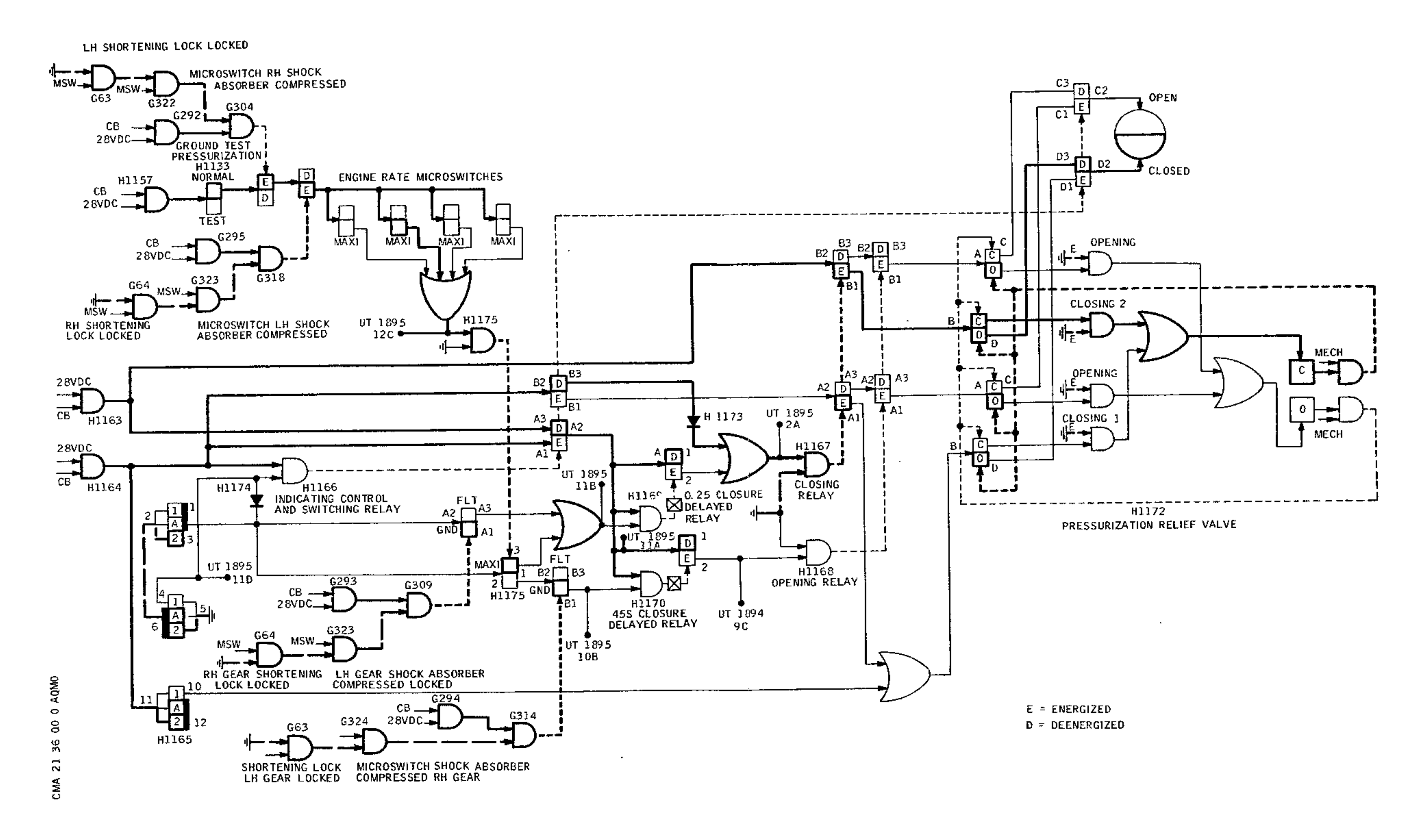
INTENTIONALLY BLANK



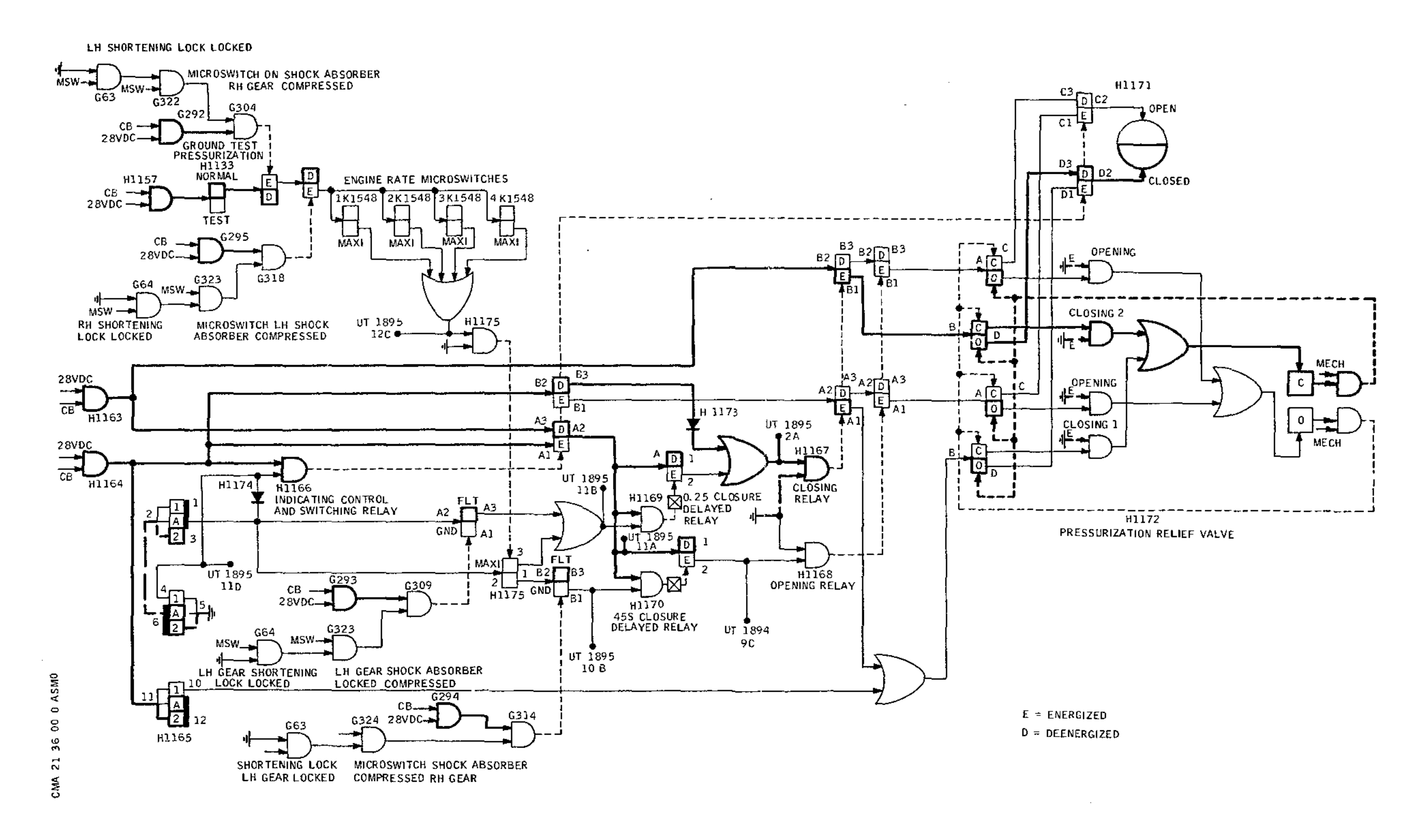
Depressurization - SHUT 1 Closure -
Aircraft on the Ground
Figure 006



Depressurization - SHUT 1 Closure - Aircraft in Flight
Figure 007



Depressurization - SHUT 2 Closure -
Aircraft on the Ground
Figure 008



Depressurization - SHUT 2 Closure - Aircraft in Flight
Figure 009

DEPRESSURIZING ON GROUND - TROUBLE SHOOTING

WARNING : OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

1. General

The following trouble shooting procedures are intended to enable faults found in the ground depressurizing system in flight or on the ground to be quickly rectified.

The defect can be isolated with the aid of trouble shooting procedures and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary. If a defect occurs, perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure that the operation is OK.

Bracketed numbers in the procedures and charts indicate items on the component identification table (Ref. Table 101). The table provides information, including component location, required for rectification.

All procedures dealing with trouble shooting are based on the assumption that electrical wiring is serviceable, all associated circuit breakers are set and electrical power is available unless otherwise stated. If the fault is not rectified, check the wiring in accordance with the Wiring Diagram Manual (Ref. Table 101).

2. Prepare

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Multimeter	

NOTE : Trouble shooting shall be carried out with aircraft in ground configuration, shock absorbers compressed.

B.

(1) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
DE-PRESSN MOTOR 1 SUP CONT & IND	1-213	H1163	H12
DE-PRESSN MOTOR 2 SUP CONT & IND		H1164	H13

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

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3. Trouble Shooting

```
**************************************************
* With aircraft on the ground, ground pressure    *
* relief valve [8] shuts when one or more throttle *
* control levers are in maximum thrust position. IF *
**************************************************
   ||    |   ------------------------------------------------
   ||    |   | Switch [1] in AUTO position. One or more       |
   ||    |   | throttle control levers in maximum thrust      |
   OK   NOT OK----| position. Indicator [7] striped.       |
   ||    |   | Switch [1] in SHUT 1 position. Indicator [7]   |
   ||    |   | remains striped. Cabin pressurization abnormal.|
   ||    |   | The four pressure regulating and safety valves |
   ||    |   | are shut.                                      |
   ||    |   | Replace valve [8].                             |
   ||    |   ------------------------------------------------
   ||    |
   ||    |   ------------------------------------------------
   ||    |   | Switch [1] in AUTO position. One or more       |
   ||    |   | throttle control levers in maximum thrust      |
   ||   NOT OK----| position. Indicator [7] indicates OPEN.  |
   ||    |   | Switch [1] in SHUT 1 position. Indicator [7]   |
   ||    |   | changes to shut after 19 seconds.              |
   ||    |   | Replace relay [10].                            |
   ||    |   ------------------------------------------------
   ||    |
   ||    |   ------------------------------------------------
   ||    |   | Switch [1] in AUTO position. One or more       |
   ||    |   | throttle control levers in maximum thrust      |
   ||   NOT OK----| position. Indicator [7] striped. Cabin   |
   ||    |   | pressurization abnormal. The four pressure     |
   ||    |   | regulating and safety valves are shut.         |
   ||    |   | Ref. Chart 101.                                |
   ||    |   ------------------------------------------------
   ||    |
   ||    |   ------------------------------------------------
   ||    |   | Switch [1] in AUTO position. One or more       |
   ||    |   | throttle control levers in maximum thrust      |
   ||   NOT OK----| position. Indicator [7] indicates SHUT after |
   ||        | 19 seconds.                                    |
   ||        | Ref. Chart 102.                                |
   ||        ------------------------------------------------
   ||
```

```
   ||
***************************************************
* Aircraft on ground: valve [8] shuts correctly with*
* switch [1] in AUTO position. Valve [8] shuts with *
* switch in SHUT 1 position. IF                     *
***************************************************
   ||    |           --------------------------------------------------
   ||    |          | With throttle control levers in idle position    |
   OK    NOT OK-----| and switch [1] in SHUT 1 position, indicator     |
   ||               | [7] is striped.                                  |
   ||               | Replace switch [1].                              |
   ||                --------------------------------------------------
***************************************************
* Aircraft on ground: valve [8] shuts correctly with*
* switch [1] in AUTO position. Valve [8] shuts with *
* switch in SHUT 2 position. IF                     *
***************************************************
   ||    |           --------------------------------------------------
   ||    |          | With throttle control levers in idle position    |
   OK    NOT OK-----| and switch [1] in SHUT 2 position, indicator     |
   ||               | [7] is striped.                                  |
   ||               | Ref. Chart 103.                                  |
   ||                --------------------------------------------------
***************************************************
* Valve [8] opens on landing. IF                    *
***************************************************
   ||    |           --------------------------------------------------
   ||    |          | On landing, with switch [1] in AUTO position     |
   OK    NOT OK-----| and throttle control levers in idle position     |
   ||    |          | indicator [7] is striped.                        |
   ||    |          | Ref. Chart 104.                                  |
   ||    |           --------------------------------------------------
   ||    |           --------------------------------------------------
   ||    |          | On landing, with switch [1] in AUTO position     |
   ||    NOT OK-----| and throttle control levers in idle position     |
   ||               | indicator [7] indicates SHUT.                    |
   ||               | Ref. Chart 105.                                  |
   ||                --------------------------------------------------
***************************************************
* Valve [8] indication is correct. IF               *
***************************************************
   ||    |           --------------------------------------------------
   OK    NOT OK-----| With valve [8] open or shut, indicator [7]       |
   ||               | remains striped. Ref. Chart 106.                 |
   ||                --------------------------------------------------
   ||                --------------------------------------------------
R  ||---------------| Depressurizing system on ground is operational   |
   ||                --------------------------------------------------
```

```
*************************************-------------------------------
* SWITCH [1] IN AUTO POSITION. ONE OR*| GROUND EQUIPMENT REQUIRED   |
* MORE THROTTLE CONTROL LEVERS IN    *|-----------------------------|
* MAXIMUM THRUST POSITION. INDICATOR *| DESCRIPTION       PART NO.  |
* [7] IS STRIPED. CABIN              *|-----------------------------|
* PRESSURIZATION ABNORMAL. THE FOUR  *| MULTIMETER                  |
* PRESSURE REGULATING AND SAFETY     *-------------------------------
* VALVES ARE SHUT.                   *
*************************************
**************************************************
* On relay box 11-123, on test connector UT1895,  *
* connect terminal 11B to aircraft ground. Indicator*
* [7] indicates SHUT. IF                          *
**************************************************
   ||   |          ----------------------------------------------------
   ||   |         | On relay box 11-123, on test connector UT1895     |
   OK   NOT OK----| disconnect terminal 11B from aircraft ground.     |
   ||             | Measure voltage on UT1895 between terminal A2     |
   ||             | and aircraft ground.                              |
   ||              ----------------------------------------------------
   ||                     ||     |
   ||                     ||     |      ------------------------------
   ||                     28V    0V-----| Replace relay [5].          |
   ||                     ||            ------------------------------
   ||                     ||
   ||                     ||            ------------------------------
   ||                     ||============| Replace relay [3].          |
   ||                                   ------------------------------
   ||
   ||                                   ------------------------------
   ||-----------------------------------| Replace relay [10].         |
                                        ------------------------------
```

Chart 101

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```
**************************************-------------------------------
* SWITCH [1] IN AUTO POSITION. ONE    *| GROUND EQUIPMENT REQUIRED  |
* OR MORE THROTTLE CONTROL LEVERS     *|----------------------------|
* IN MAXIMUM THRUST POSITION.         *| DESCRIPTION      PART NO.  |
* INDICATOR [7] INDICATES SHUT AFTER  *|----------------------------|
* 19 SECONDS.                         *| MULTIMETER                 |
**************************************-------------------------------
*****************************************************
* On valve [8] disconnect connectors H1172A and     *
* H1172B. Check 28VDC between power side of         *
* terminals B and E on both connectors, with one or *
* more throttle control levers in maximum thrust    *
* position. Measure voltage between terminals on    *
* both connectors.                                  *
*****************************************************
   ||   |
   28V  0V
   ||   on                                   ------------------------------
   ||  H1172B--------------------------------| Replace relay [3].         |
   ||   |                                    ------------------------------
   ||   |
   ||   0V
   ||   on                   ---------------------------------------------------
   ||  H1172A------| Replace relay [3]. Measure voltage on connector|
   ||              | H1172A between terminals B and E.              |
   ||              ---------------------------------------------------
   ||                 ||        |
   ||                 ||        |                ------------------------------
   ||                 28V       0V-----| Replace relay [2].         |
   ||                 ||                         ------------------------------
   ||                 ||
   ||                 ||                         ------------------------------
   ||                 ||-----------------| Relay [3] was defective.   |
   ||                                            ------------------------------
   ||
   ||                                            ------------------------------
   ||----------------------------------------| Replace valve [8].         |
                                                 ------------------------------
```

Chart 102

```
*************************************-------------------------------
* THROTTLE CONTROL LEVERS IN IDLE    *| GROUND EQUIPMENT REQUIRED  |
* POSITION. SWITCH [1] IN SHUT 2     *|----------------------------|
* POSITION. INDICATOR [7] IS STRIPED.*| DESCRIPTION       PART NO. |
*************************************|----------------------------|
                                     | MULTIMETER                 |
                                     ------------------------------

***************************************************
* Trip circuit breaker [13]. In relay box 11-123  *
* check diode [9]. IF                             *
***************************************************
   ||    |
   ||    |
   ||    |
   ||    |                           ------------------------------
   OK    NOT OK----------------------| Replace diode [9].         |
   ||                                ------------------------------
   ||
   ||
   ||
   ||                                ------------------------------
   ||--------------------------------| Replace relay [2].         |
                                     ------------------------------
```

Chart 103

```
**************************************-------------------------------
* ON LANDING, WITH SWITCH [1] IN AUTO*| GROUND EQUIPMENT REQUIRED   |
* POSITION AND THROTTLE CONTROL      *|-----------------------------|
* LEVERS IN LOW POSITION, INDICATOR  *| DESCRIPTION        PART NO. |
* [7] IS STRIPED.                    *|-----------------------------|
**************************************| MULTIMETER                  |
                                      -------------------------------

****************************************************
* On valve [8], disconnect connectors H1172A and   *
* H1172B. Measure voltage between terminal A and   *
* chassis.                                         *
****************************************************
   ||   |            ------------------------------------------------
   ||   |           | On relay box 11-123, on test connector UT1894, |
   28V  0V----------| measure voltage between terminal 9C and        |
   ||               | aircraft ground.                               |
   ||                ------------------------------------------------
   ||                   ||     |          ---------------------------
   ||                   0V     28V--------| Replace relay [4].       |
   ||                   ||                ---------------------------
   ||                ------------------------------------------------
   ||               | On relay box 11-123, on test connector UT1895, |
   ||               | connect terminal B10 to aircraft ground. On    |
   ||               | test connector UT1894 measure voltage between  |
   ||               | terminal 9C and aircraft ground.               |
   ||                ------------------------------------------------
   ||                   ||     |          ---------------------------
   ||                   28V    0V---------| Replace relay [6].       |
   ||                   ||                ---------------------------
   ||                ------------------------------------------------
   ||               | Remove relay [10] from relay box 11-123. Check |
   ||               | continuity between terminals 2 and 1.          |
   ||                ------------------------------------------------
   ||                   ||      |         ---------------------------
   ||                 INFINITE  |         | Install relay [10] and   |
   ||               RESISTANCE |0Ω--------| replace relay [12].      |
   ||                   ||                ---------------------------
   ||                   ||                ---------------------------
   ||                   ||----------------| Replace relay [10].      |
   ||                                     ---------------------------
   ||                                     ---------------------------
   ||-------------------------------------| Replace valve [8].       |
                                          ---------------------------
```

Chart 104

```
***************************************-------------------------------
* ON LANDING, WITH SWITCH [1] IN AUTO*| GROUND EQUIPMENT REQUIRED   |
* POSITION AND THROTTLE CONTROL      *|-----------------------------|
* LEVERS IN IDLE POSITION, INDICATOR *| DESCRIPTION        PART NO. |
* [7] INDICATES SHUT.                *|-----------------------------|
***************************************| MULTIMETER                 |
                                      -------------------------------

*****************************************************
* Trip circuit breaker [13]. Valve [8] opens after  *
* 19 seconds. IF                                    *
*****************************************************
   ||    |
   ||    |                 ---------------------------------------------
   ||    |                | Open panel 1-214. With switch [1] in AUTO   |
   OK    NOT OK-----------| position measure continuity between terminal|
   ||                     | 1 and aircraft ground. IF                   |
   ||                      ---------------------------------------------
   ||                         ||    |
   ||                         ||    |               ------------------------------
   ||                         OK    NOT OK==========| Replace switch [1].        |
   ||                         ||                    ------------------------------
   ||                         ||
   ||                         ||                    ------------------------------
   ||                         ||--------------------| Replace relay [11].        |
   ||                                               ------------------------------
   ||
*****************************************************
* In relay box 11-123 check diode [14].             *
*****************************************************
   ||    |
   ||    |                                          ------------------------------
   OK    NOT OK-------------------------------------| Replace diode [14].        |
   ||                                               ------------------------------
   ||
   ||                                               ------------------------------
   ||-----------------------------------------------| Replace relay [2].         |
                                                    ------------------------------
```

Chart 105

```
*************************************---------------------------------
* WITH VALVE [8] OPEN OR SHUT,      *| GROUND EQUIPMENT REQUIRED     |
* INDICATOR [7] REMAINS STRIPED.    *|-------------------------------|
*************************************| DESCRIPTION        PART NO.   |
                                     |-------------------------------|
                                     | MULTIMETER                    |
                                     ---------------------------------

*****************************************************
* Place switch [1] in SHUT 2 position. Indicator [7]*
* indicates :                                       *
*****************************************************
    ||    |
    ||    |          ----------------------------------------------------
    ||    |          | Place switch [1] in SHUT 1 position. On valve    |
STRIPES  |-SHUT----| [8] disconnect connector H1172A. On power side   |
    ||               | of connector shunt terminals B and D.            |
    ||               | Indicator [7] indicates :                        |
    ||               ----------------------------------------------------
    ||                      ||     |
    ||                      ||     |          -------------------------------
    ||                     SHUT   STRIPES---| Replace relay [2].          |
    ||                      ||                -------------------------------
    ||                      ||
    ||                      ||                -------------------------------
    ||                      ||--------------| Replace valve [8].          |
    ||                                        -------------------------------
    ||
    ||                                        -------------------------------
    ||--------------------------------------| Replace indicator [7].      |
                                              -------------------------------
```

Chart 106

	ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
	[1] Switch		1-214	H1165		21-30-00 R/I	21-35-22
R R	[2] Relay	123AB	11-123	H1166		21-30-00 R/I	21-35-22
R R	[3] Relay	123AB	11-123	H1167		21-30-00 R/I	21-35-22
R R	[4] Relay	123AB	11-123	H1168		21-30-00 R/I	21-35-22
R R	[5] Relay	123AB	11-123	H1169		21-30-00 R/I	21-35-22
R R	[6] Relay	123AB	11-123	H1170		21-30-00 R/I	21-35-22
	[7] Ground pressure relief valve magnetic indicator		1-214	H1171		21-30-00 R/I	21-35-22
	[8] Ground pressure relief valve	222 TF		H1172		21-36-11 R/I	21-35-22
R R	[9] Diode	123AB	11-123	H1173		21-30-00 R/I	21-35-22
R R	[10] Relay	123AB	11-123	H1175		21-30-00 R/I	21-35-22
R R	[11] Relay	123AB	2-123	G309		32-00-00 R/I	21-35-22
R R	[12] Relay	123AB	3-123	G314		32-00-00 R/I	21-35-22
	[13] Circuit breaker		1-213	H1164	H13	24-50-00 R/I	21-35-22

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
R [14] Diode	123AB	11-123	H1174		21-30-00 R/I	21-35-22

Component Identification
Table 101

5. Close-Up

De-energize the aircraft electrical network and disconnect electrical ground power unit.

GROUND PRESSURE RELIEF VALVE - REMOVAL/INSTALLATION

1. General

2. Ground Pressure Relief Valve

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	

B. Prepare

(1) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
DE-PRESSN MOTOR 1 SUP CONT & IND	1-213	H1163	H12
DE-PRESSN MOTOR 2 SUP CONT & IND	1-213	H1164	H13

(2) In passenger compartment open access doors 222TF.

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connectors (3) and (4).

(2) Disconnect bonding strip (2).

(3) Remove clamp (1).

(4) Remove valve (5), discard seal (6).

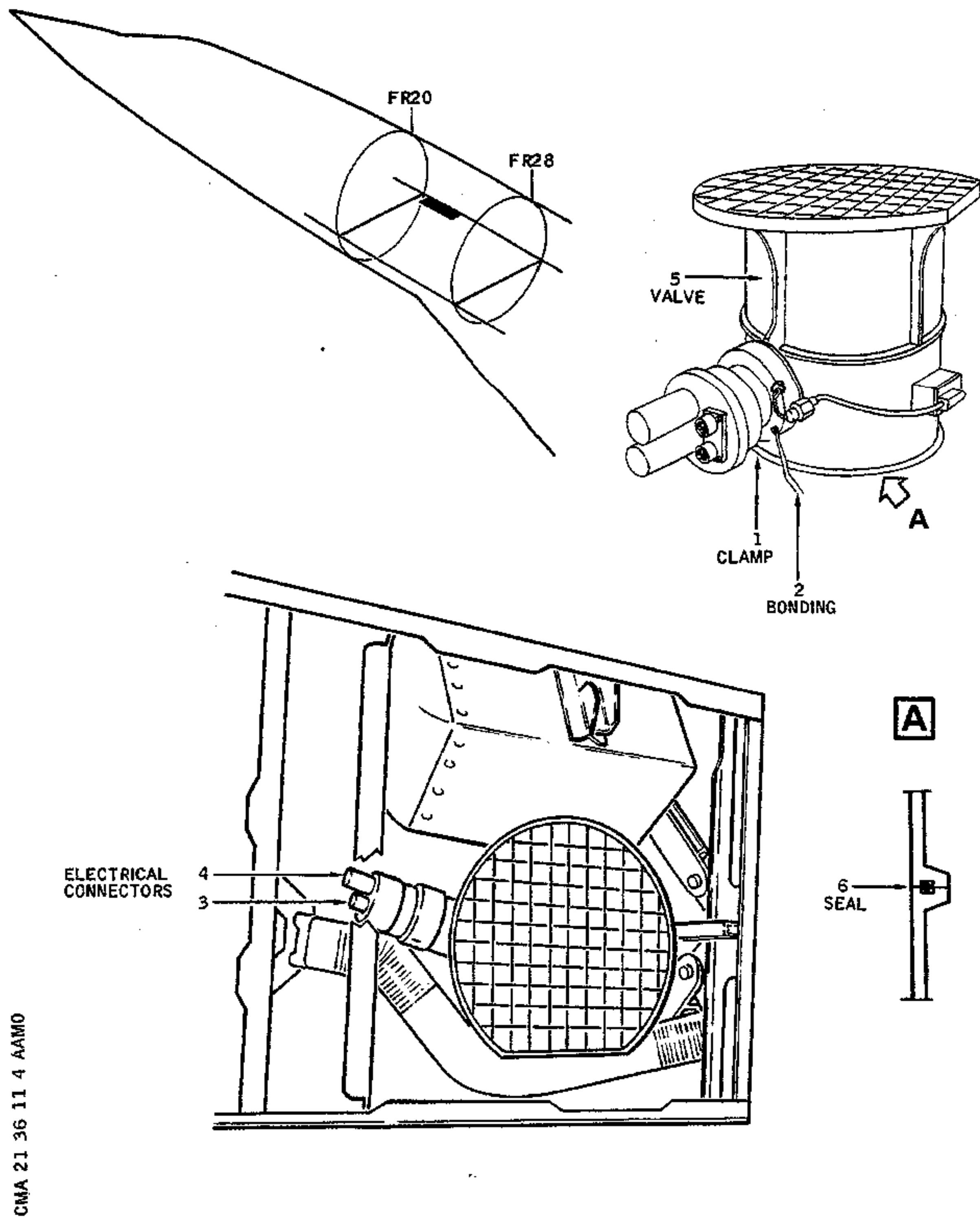
D. Install

(1) Install seal (6) on flange.

(2) Install valve (5).

(3) Install clamp (1).

(4) Connect bonding strip (2).



Ground Pressure Relief Valve
Figure 401

R

(5) Connect electrical connectors (3) and (4).

E. Test

Ref. 21-36-11, Adjustment/Test.

F. Close-Up

(1) Close access door.

(2) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2. B. (1).

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GROUND PRESSURE RELIEF VALVE - ADJUSTMENT/TEST

1. General

The purpose of this valve is to reduce differential pressure on the ground and to limit cabin pressure jerks due to engine rate variations.

2. Operational Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	

B. Prepare

(1) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
DEPRESSN MOTOR 1 SUP CONT IND	1-213	H1163	H12
DEPRESSN MOTOR 2 SUP CONT IND		H1164	H13
LH U/C WEIGHT SW "A" SYS SUP		G 292	M17
RH U/C WEIGHT SW "A" SYS SUP		G 295	M18
LH U/C WEIGHT SW "B" SYS SUP	3-213	G 293	B 8
RH V/C WEIGHT SW "B" SYS SUP		G 294	B 9
SYS 1 GRD PRESSN CONT	15-215	H1157	E 3

(2) In flight compartment, on centre console, check that the four throttle controls are in low position (idle)

(3) At flight engineer's station, on CABIN PRESSURE CONTROL panel, check that SHUT 1 - AUTO - SHUT 2 switch is in AUTO POSITION

GROUND PRESSURE RELIEF VALVE magnetic indicator must display stripes

(4) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, S)
GROUND PRESSURE RELIEF VALVE magnetic indicator must display OPEN

C. Test

(1) On CABIN PRESSURE CONTROL panel, at flight engineer's station, place SHUT 1 - AUTO - SHUT 2 switch in SHUT 1 position
GROUND PRESSURE RELIEF VALVE must display stripes then SHUT

(2) Return SHUT 1 - AUTO - SHUT 2 switch in AUTO position
GROUND PRESSURE RELIEF VALVE magnetic indicator displays stripes then OPEN

(3) Place SHUT 1 - AUTO - SHUT 2 switch in SHUT 2 position
GROUND PRESSURE RELIEF VALVE magnetic indicator must display stripes then SHUT

(4) Return SHUT 1 - AUTO - SHUT 2 switch in AUTO position
GROUND PRESSURE RELIEF VALVE must display stripes then OPEN

(5) In flight compartment, on centre console push throttle control levers upwards (take off)
GROUND PRESSURE RELIEF VALVE magnetic indicator must display stripes then SHUT

(6) Trip circuit breaker G 293 (B8 panel 3-213). No change occurs

(7) Return throttle control levers downwards (idle). No change occurs

(8) Set circuit breaker G 293 (B8 panel 3-213) GROUND PRESSURE RELIEF VALVE magnetic indicator must display stripes then OPEN

NOTE : Displacement upwards (take off) of only one throttle control lever causes the ground pressure relief valve to close.

D. Close Up

De-energize the aircraft electrical network and disconned electrical ground power unit.

3. Functional Test

A. Functional Test of pneumatic safety device of ground pressure relief valve

B. Equipment and Materials

DESCRIPTION	PART NO.
Compressed Air Supply Unit Provided with a Pressure Reducing Valve Capable of Delivering a Pressure of 0 to 1.74 psi (0 to 120 mb)	

C. Prepare

(1) Open floor panels 222 TF and 222 SF

(2) Unscrew and remove cap from ground pressure relief valve pneumatic safety device test connector

(3) Connect compressed air supply unit to pneumatic safety device test connector.

D. Test

(1) Open pressurized air supply unit; progressively increase pressure.
Visually check that pneumatic safety system butterfly locking plunger protrudes for a pressure value of 1.16 + 0.30 - 0 psi

(2) Shut down pressure visually check that pneumatic safety device butterfly locking plunger has retracted

E. Close Up

(1) Disconnect compressed air supply unit from ground pressure relief valve (H1172) pneumatic safety device

(2) Screw cap protecting thread of pneumatic safety device test connector

(3) Make certain that working area is clean and clear of tools and miscellaneous items of equipment

(4) Install floor panels 222TF and 222SF.

SAFETY VALVE - REMOVAL/INSTALLATION

1. General
(Ref. Fig. 401)

Safety valves A511 and C511 are located in nose gear bay on discharge nozzle of regulating and safety valve associated with system 1 (for safety valve A511) and system 2 (for safety valve C511).

They are identical, thus the removal/installation procedure is the same for each of them.

2. Safety Valve

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 10 ft. 10 in. (3.22 m)	

B. Prepare

(1) Open nose gear doors (Ref. 32-00-00, Servicing).

(2) Position access platform.

C. Remove
(Ref. Fig. 402)

(1) Remove cotter pins (1).

(2) Remove nuts (2), retain washers (4) and screws (3).

(3) Remove safety valve by pulling it forwards.

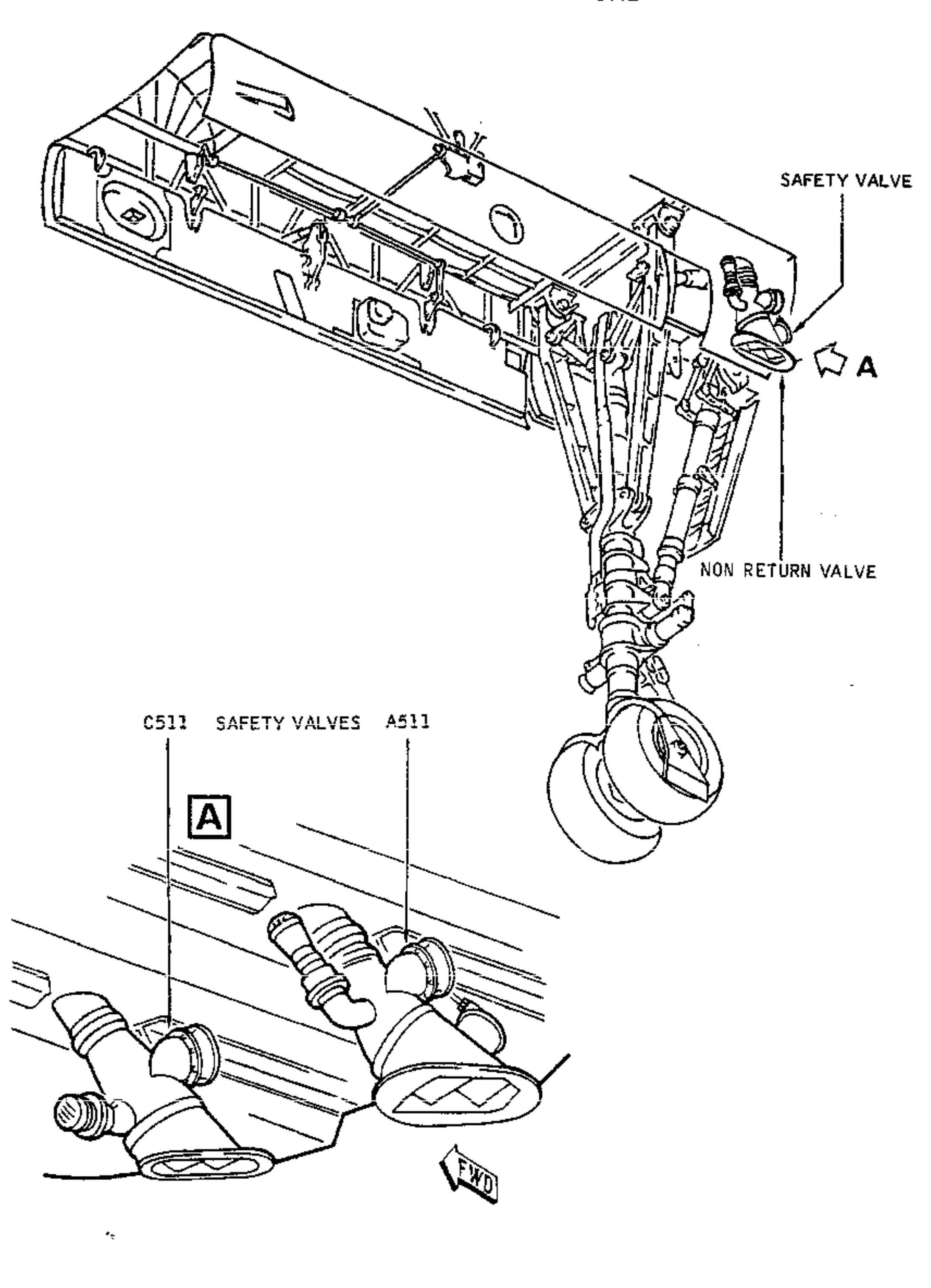
D. Preparation of Replacement Component

(1) If necessary, remove the storage protective caps.

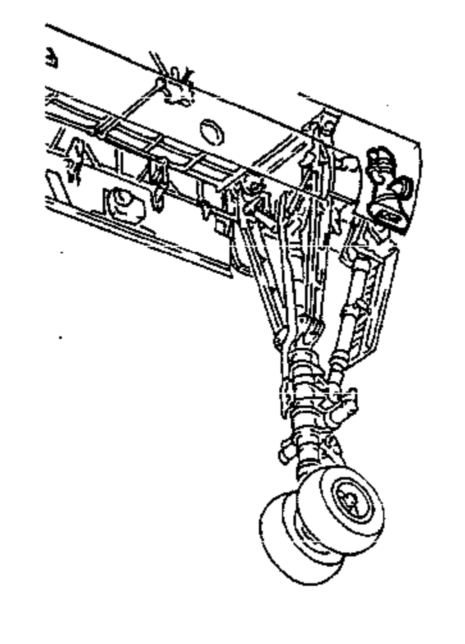
(2) Make certain that the safety valve bears no evidence of dents, scratches paint and that the protective screen is not damaged.

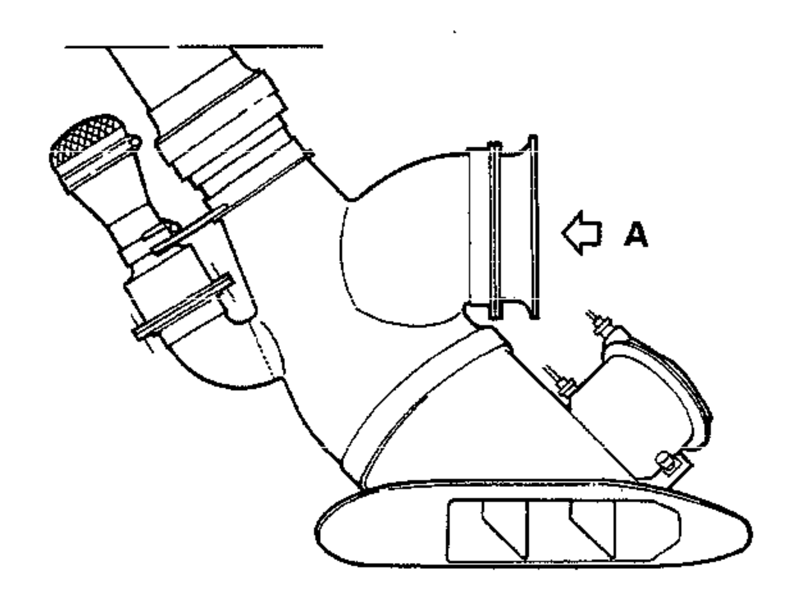
E. Install

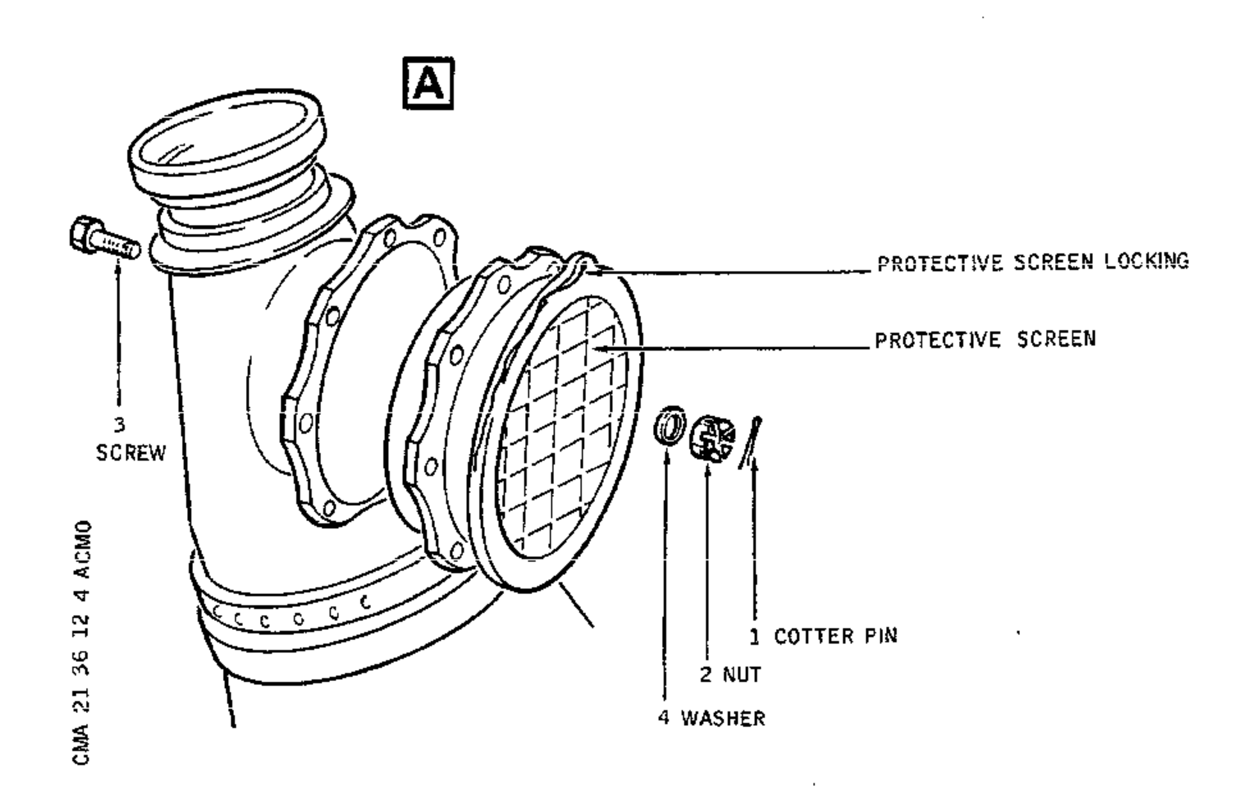
(1) Install safety valve in its housing.



Safety Valve Location
Figure 401







Safety Valves
Figure 402

(2) Install screws (3), washers (4) and screw nuts (2).

(3) Tighten nuts (2) ; safety with cotter pins (1).

(4) Check that the screen attachment screws are correctly locked ; replace lockwire if necessary.

F. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) Remove access platform.

(3) Close landing gear doors (Ref. 32-00-00, Servicing).

SAFETY VALVE - ADJUSTMENT/TEST

1. General

   Two safety valves are located in the nose gear bay on the discharge nozzles of the regulating and safety valves.

   Access is through the nose gear bay doors. The valves limit bay pressure should the ground pressure relief valve stay open in flight.

2. Operational Test

   A. Prepare - as per page 401

   B. Test with screwdriver or suitable probe inserted through protective screen, check valve flaps for freedom of movement, spring tension and that the spring retains flaps in the closed position.

END OF THIS SECTION

NEXT

TEMPERATURE CONTROL - DESCRIPTION AND OPERATION

1. General

A. The temperature control system enables the air temperature in the three fuselage compartments to be adjusted to required levels.
Under normal conditions air is bled from engine 1 (group 1) to supply flight compartment conditioning system, from engine 2 (group 2) to supply forward cabin, and from engines 3 and 4 (groups 3 and 4) to supply aft cabin.

B. A limitation phase allows conditioning air temperature to be reduced to relatively low values (Ref. 21-12-00).
The temperature control phase follows this limitation.

C. Each air conditioning group has its own temperature control system which ensures the following functions :

(1) Adjustment of the conditioning air temperature for its associated compartment.

(2) Limitation of minimum and maximum temperature in the distribution duct (from -2°C to + 35°C for flight compartment and from -10°C to +35°C for cabin).

(3) Limitation of minimum and maximum temperatures in the duct downstream of the mixing point :

(a) For an altitude below 30,000 ft : from +5°C to + 80°C.

(b) For an altitude above 30,000 ft : from -30°C to + 80°C

(4) De-icing of the system downstream of the expansion turbine (above 30,000 ft only) if required.

D. These functions are achieved through four temperature control systems :

(1) System 1 controls temperature in flight compartment.

(2) System 2 controls temperature in forward cabin.

(3) Systems 3 and 4 control temperature in aft cabin.
They can operate independently but are normally connected in order to obtain from group 3 a mixing temperature equal to that from group 4. In that case, system 4 controls the temperature for both groups.

E. Temperature is controlled either automatically or manually from 4 selector switches (one per system).

F. Should one air conditioning group fail to operate, switching circuits enable :

- the faulty air conditioning group to be isolated
- group 3 to be disconnected from group 4 temperature control system
- faulty group to be replaced by adjacent group which then uses its own temperature control system.

TEMPERATURE CONTROL - TROUBLE SHOOTING

WARNING : OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

1. General

The following trouble shooting procedures are intended to enable faults found in the temperature control system to be quickly rectified.
The defect can be isolated with the aid of the trouble shooting procedures and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary.
If a defect occurs perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure the operation is OK.

Bracketed numbers in the procedures and charts indicate items on the component identification table (Ref. Table 101).
The table provides information, including component location, required for rectification.

All procedures dealing with trouble shooting are based on the assumption that electrical wiring is serviceable, all associated circuit breakers are set and electrical power is available, unless otherwise stated. If the fault is not rectified check the wiring in accordance with the Wiring Diagram Manual (Ref. Table 101).

The system is composed of 4 indentical groups; trouble shooting is accomplished for group 1. The designation, identification and location of components corresponding to groups 2,3 and 4 are indicated in the Component Identification Table.

R B A temperature control valve should only be changed if it does not
R B move when under standby control.
R B Failure to control in auto mode only is more likely to be caused
R B by a faulty temperature controller or duct temperature sensor.

Trouble shooting shall be carried out with aircraft in ground configuration, shock absorbers compressed.

2. Prepare

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Electronic Multimeter	

B.

(1) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP 1 CAU/DUCT TEMP IND	1-213	1D 162	E11
GRP 2 CAU/DUCT TEMP IND	5-213	2D 162	D 9
GRP 3 CAU/DUCT TEMP IND	15-215	3D 162	C 4
GRP 4 CAU/DUCT TEMP IND	15-216	4D 162	C23
TEMP COMPTR IND & GRP SELECT M1 SUP	5-213	H 999	B 9
GRP 3 BUS NORM SUP	15-215	H1900	G 3
GRP 3 BUS STBY SUP	1-213	H1901	F12
GRP 4 BUS NORM SUP	15-216	H1902	F23
GRP 4 BUS STBY SUP	5-213	H1903	B10
GRP 3 & 4 COMPTR CONT	4-213	H1006	C11
FLT DECK TEMP IND	1-213	1D 161	E10
FWD CABIN TEMP IND	5-213	2D 161	D 8
REAR CABIN TEMP IND	15-215	3D 161	C 3
GRP 1 TEMP SELECTOR AUTO SUP & CONT	2-213	H1000	B17
GRP 2 TEMP SELECTOR AUTO SUP & CONT	4-213	H1001	E11
GRP 3 TEMP SELECTOR AUTO SUP & CONT	2-213	H1002	G16
GRP 4 TEMP SELECTOR AUTO SUP & CONT	4-213	H1003	B12
GRP 1 TEMP SELECTOR MANL SUP & CONT	1-213	H 991	F11
GRP 2 TEMP SELECTOR MANL SUP & CONT	5-213	H 992	B 8
GRP 3 TEMP SELECTOR MANL SUP & CONT	15-215	H 993	D 3
GRP 4 TEMP SELECTOR MANL SUP & CONT	15-216	H 994	C24
GRP 1 SAMPLING DUCT FAN SUP	2-213	H1004	B16
GRP 2 SAMPLING DUCT FAN SUP	4-213	H1005	D12
GRP 1 TEMP VALVE POSN IND	13-215	H1007	E 1
GRP 2 TEMP VALVE POSN IND	13-215	H1008	E 2
GRP 3 TEMP VALVE POSN IND	13-216	H1009	C19
GRP 4 TEMP VALVE POSN IND	13-216	H1010	D19

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP 1 ICE DETECTOR SENSOR SUP	15-215	H 995	D 4
GRP 2 ICE DETECTOR SENSOR SUP	15-216	H 996	D24
GRP 3 ICE DETECTOR SENSOR SUP	15-215	H 997	E 4
GRP 4 ICE DETECTOR SENSOR SUP	15-216	H 998	E23

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

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3. Trouble Shooting

```
*****************************************************
* Engine on.                                        *
* It is possible to obtain low temperature in both  *
* AUTO and STAND BY ranges using selector [17]. IF  *
*****************************************************
    ||    |       ---------------------------------------------
    ||    |       | Selector [17] in :                        |
    OK    NOT OK--| - AUTO range                              |
    ||            | - STAND BY range                          |
    ||            | Indicator [28] indicates C.               |
    ||            | DUCT indicator [4] reading remains high.  |
    ||            | Replace cold air unit [8].                |
    ||            ---------------------------------------------
*****************************************************
* DUCT warning light on panel 2-214 does not        *
* illuminate with selector [17] in                  *
* AUTO range                                        *
* STAND BY range. IF                                *
*****************************************************
    ||    |       ---------------------------------------------
    ||    |       | Selector [17] in :                        |
    ||    |       | - AUTO range                              |
    OK    NOT OK--| - STAND BY range                          |
    ||    |       | AIR warning light on panel 4-211 illuminates.  |
    ||    |       | DUCT warning light on panel 2-214 illuminates. |
    ||    |       | Indicator [28] indicates H.               |
    ||    |       | DUCT indicator [4] reading more than 120°C. |
    ||    |       | Replace valve [20].                       |
    ||    |       ---------------------------------------------
    ||    |       ---------------------------------------------
    ||    |       | Selector [17] in :                        |
    ||    |       | - AUTO range                              |
    ||    |-------| - STAND BY range                          |
    ||            | AIR warning light on panel 4-211 illuminates.  |
    ||            | DUCT warning light on panel 2-214 illuminates. |
    ||            | Indicator [28] indicates C.               |
    ||            | DUCT indicator [4] reading below 0°C.     |
    ||            | Replace valve [20].                       |
    ||            ---------------------------------------------
*****************************************************
* Group functions correctly in STAND BY range.      *
* In AUTO range, DUCT warning light on panel 2-214  *
* does not illuminate. IF                           *
*****************************************************
    ||    |
    OK    NOT OK
    ||    |
```

```
   ||      |                ------------------------------------------------
   ||      |-------| Selector [17] in AUTO range.                          |
   ||      |       | AIR warning light on panel 4-211 illuminates.         |
   ||      |       | DUCT warning light on panel 2-214 illuminates.        |
   ||      |       | DUCT indicator [4] reading more than 120°C.           |
   ||      |       | Ref. Chart 101.                                       |
   ||      |        ------------------------------------------------
   ||      |        ------------------------------------------------
   ||      |-------| Selector [17] in AUTO range.                          |
   ||              | AIR warning light on panel 4-211 illuminates.         |
   ||              | DUCT warning light on panel 2-214 illuminates.        |
   ||              | DUCT indicator [4] reading below 0°C.                 |
   ||              | Ref. Chart 102.                                       |
   ||               ------------------------------------------------
************************************************************
* Aircraft in flight :                                     *
* Group functions correctly in STAND BY range.             *
* With selector [17] in AUTO range, group functions        *
* correctly, IF                                            *
************************************************************
   ||      |        ------------------------------------------------
   OK    NOT OK    | Selector [17] in AUTO range ineffective at            |
   ||      |       | altitude less than 30 000 ft.                         |
   ||      |-------| DUCT indicator [4] reading remains at + 80°C.         |
   ||      |       | Ref. Chart 103.                                       |
   ||      |        ------------------------------------------------
   ||      |        ------------------------------------------------
   ||      |       | Selector [17] in AUTO range ineffective at            |
   ||      |       | altitude less than or greater than 30 000 ft.         |
   ||      |-------| DUCT indicator [4] reading remains at + 35°C.         |
   ||      |       | Ref. Chart 104.                                       |
   ||      |        ------------------------------------------------
   ||      |
   ||      |        ------------------------------------------------
   ||      |       | Selector [17] in AUTO range ineffective at            |
   ||      |       | altitude less than 30 000 ft.                         |
   ||      |-------| DUCT indicator [4] reading remains at + 5°C.          |
   ||      |       | Ref. Chart 105.                                       |
   ||      |        ------------------------------------------------
   ||      |
   ||      |        ------------------------------------------------
   ||      |       | Selector [17] in AUTO range ineffective at            |
   ||      |       | altitude greater than 30 000 ft.                      |
   ||      |-------| DUCT indicator [4] reading remains at + 80°C.         |
   ||      |       | Ref. Chart 106.                                       |
   ||      |        ------------------------------------------------
   ||      |
```

```
 ||     |
 ||     |        -----------------------------------------------------
 ||     |        | Selector [17] in AUTO range ineffective at        |
 ||     |        | altitude greater than 30 000 ft.                  |
 ||     |--------| DUCT indicator [4] reading remains at - 30°C.     |
 ||     |        | Ref. Chart 107.                                   |
 ||     |        -----------------------------------------------------
 ||     |
 ||     |
 ||     |        -----------------------------------------------------
 ||     |        | Selector [17] in AUTO range ineffective at        |
 ||     |        | altitude greater than 30 000 ft.                  |
 ||     |--------| DUCT indicator [4] reading remains at - 10°C.     |
 ||              | Ref. Chart 108.                                   |
 ||              -----------------------------------------------------
*****************************************************
* Selectors [17] for groups 3 and 4 (slaved) in     *
* AUTO range.                                       *
* Groups function correctly. IF                     *
*****************************************************
 ||     |        -----------------------------------------------------
 ||     |        | Group 3 and 4 DUCT indicator [4] readings         |
 OK    NOT OK    | different. On panel 2-214, COMPARATOR indicator|
 ||     |--------| light illuminated.                                |
 ||     |        | Ref. Chart 109.                                   |
 ||     |        -----------------------------------------------------
 ||     |        -----------------------------------------------------
 ||     |        | Not possible to control temperature with          |
 ||     |        | group 4 selector [17] at altitude greater than    |
 ||     |--------| 30 000 ft.                                        |
 ||     |        | Groups separated by placing switch [27] in        |
 ||     |        | FAILED position.                                  |
 ||     |        | Group 3 selector [17] in STAND BY range,          |
 ||     |        | Group 4 selector [17] in AUTO range.              |
 ||     |        | Groups function correctly.                        |
 ||     |        | Ref. Chart 110.                                   |
 ||     |        -----------------------------------------------------
 ||     |        -----------------------------------------------------
 ||     |        | Not possible to control temperature with          |
 ||     |        | group 4 selector [17] at altitude greater than    |
 ||     |--------| 30 000 ft.                                        |
 ||     |        | Groups separated by placing switch [27] in        |
 ||     |        | FAILED position.                                  |
 ||     |        | Group 3 selector [17] in AUTO range, group 4      |
 ||     |        | selector [17] in STAND BY range.                  |
 ||     |        | Groups function correctly.                        |
 ||     |        | Ref. Chart 111.                                   |
 ||     |        -----------------------------------------------------
 ||     |
```

On panel 4-211, AIR warning light illuminates and on panel 2-214, group 3 DUCT warning light illuminates, followed by group 4 DUCT warning light.
Ground 4 DUCT indicator [4] reading greater than 120°C.
Ref. Chart 112.

On panel 4-211, AIR warning light illuminates and on panel 2-214, group 3 DUCT warning light illuminates, followed by group 4 DUCT warning light. Group 4 DUCT indicator [4] reading less than 0°C.
Ref. Chart 113.

AIR and group 3 DUCT warning lights illuminate.
Group 3 DUCT indicator [4] reading greater than 120°C.
Switch [27] in FAILED position.
Group 3 functions correctly in STAND BY range
Ref. Chart 114.

AIR and group 3 DUCT warning lights illuminate.
Group 3 DUCT indicator [4] reading less than 0°C.
Switch [27] in FAILED position.
Group 3 functions correctly in STAND BY range
Ref. Chart 115.

AIR and group 4 DUCT warning lights illuminate.
Group 4 DUCT indicator [4] reading greater than 120°C.
Switch [27] in FAILED position.
Group 4 functions correctly in STAND BY range.
Ref. Chart 116.

AIR and group 4 DUCT warning lights illuminate.
Group 4 DUCT indicator [4] reading less than 0°C.
Switch [27] in FAILED position.
Group 4 functions correctly in STAND BY range.
Ref. Chart 117.

```
    ||
**************************************************
* Switches [26] and [27] in ON position.         *
* Group supply magnetic indicators and COMPARATOR *
* indicator light function correctly. IF         *
**************************************************
    ||     |          ---------------------------------------------
    ||     |         | Switches [26] and [27] in ON position.     |
    OK     NOT OK--| Group supply magnetic indicators display    |
    ||               | stripes.                                    |
    ||               | Replace circuit breaker [13].               |
    ||                ---------------------------------------------
**************************************************
* Group 1 switch [26] in FAILED position.        *
* Group supply changeover functions correctly. IF *
**************************************************
    ||     |          ---------------------------------------------
    ||     |         | Group 1 switch [26] in FAILED position.     |
    OK     NOT OK--| Group supply magnetic indicators display    |
    ||               | stripes.                                    |
    ||               | Replace group 1 switch [26].                |
    ||                ---------------------------------------------
**************************************************
* Group 2 switch [26] in FAILED position.        *
* Group supply changeover functions correctly. IF *
**************************************************
    ||     |          ---------------------------------------------
    ||     |         | Group 2 switch [26] in FAILED position.     |
    OK     NOT OK--| Group supply magnetic indicators display    |
    ||               | stripes.                                    |
    ||               | Ref. Chart 118.                             |
    ||                ---------------------------------------------
**************************************************
* Indicator [28] functions correctly. IF         *
*                                                *
**************************************************
    ||     |          ---------------------------------------------
    ||     |         | DUCT indicator [4] functions correctly.     |
    OK     NOT OK--| Indicator [28] does not function correctly  |
    ||               | Ref. Chart 119.                             |
    ||                ---------------------------------------------
**************************************************
* CAU IN indicator [4] functions correctly. IF   *
*                                                *
**************************************************
    ||     |          ---------------------------------------------
    OK     NOT OK--| CAU IN indicator [4] reading maximum.       |
    ||               | Ref. Chart 120.                             |
    ||                ---------------------------------------------
```

```
    ||
*****************************************************
* DUCT indicator [4] functions correctly. IF        *
*****************************************************
    ||     |       ---------------------------------------------------
    OK     NOT OK--| DUCT indicator [4] reading maximum.             |
    ||             | Ref. Chart 121.                                 |
    ||             ---------------------------------------------------
*****************************************************
* CAU IN and DUCT indicator [4] functions correctly.*
* IF                                                *
*****************************************************
    ||     |       ---------------------------------------------------
    OK     NOT OK--| Flag appears on indicator [4].                  |
    ||             | Ref. Chart 122.                                 |
    ||             ---------------------------------------------------
*****************************************************
* Indicator [3] functions correctly. IF             *
*****************************************************
    ||     |       ---------------------------------------------------
    OK     NOT OK--| Indicator [3] reading maximum.                  |
    ||     |       | Ref. Chart 123.                                 |
    ||     |       ---------------------------------------------------
    ||     |       ---------------------------------------------------
    ||     |-------| Indicator [3] reading minimum.                  |
    ||     |       | Ref. Chart 124.                                 |
    ||     |       ---------------------------------------------------
    ||     |       ---------------------------------------------------
    ||     |-------| On the ground, indicator [3] functions          |
    ||             | correctly.                                      |
    ||             | Ref. Chart 125.                                 |
    ||             ---------------------------------------------------
*****************************************************
* Selector [17] functions correctly in STAND BY     *
* range. IF                                         *
*****************************************************
    ||     |       ---------------------------------------------------
    ||     |       | Impossible to obtain cold air with selector     |
    OK     NOT OK--| [17] at -3 in STAND BY range.                   |
    ||     |       | Ref. Chart 126.                                 |
    ||     |       ---------------------------------------------------
    ||     |       ---------------------------------------------------
    ||     |-------| Impossible to obtain warm air with selector     |
    ||             | [17] at 3 in STAND BY range.                    |
    ||             | Ref. Chart 127.                                 |
    ||             ---------------------------------------------------
    ||
    ||
```

||

```
***************************************************
* Temperature control system is serviceable.      *
* De-energize the aircraft electrical network and *
* disconnect electrical ground power unit.        *
* (Ref. 24-41-00, Servicing).                     *
***************************************************
```

```
*************************************------------------------------
* SELECTOR [17] IN AUTO RANGE.      *| GROUND EQUIPMENT REQUIRED  |
* AIR AND DUCT WARNING LIGHTS       *|----------------------------|
* ILLUMINATED.                      *| DESCRIPTION        PART NO |
* DUCT INDICATOR [4] READING GREATER *|----------------------------|
* THAN 120°C.                       *| ELECTRONIC MULTIMETER      |
* INDICATOR [28] INDICATES H.       *------------------------------
*************************************
**************************************************
* Remove controller [18] and check isolation between*
* terminal 25 of connector H1023A and aircraft    *
* ground. IF                                      *
**************************************************
    |     |        ---------------------------------------------
R   OK    NOT OK==| Disconnect valve [20] connector and repeats |
R   |             | the same test.                              |
    |              ---------------------------------------------
    |                  |    |         -----------------------------
    |                  |    |        | Restore wiring between      |
    |                  |   NOT OK---| controller [18] and valve    |
    |                  |             | [20] to connect condition.  |
    |                  |             | Ref. WDM 21-61-01.          |
    |                  |              -----------------------------
    |                  |              -----------------------------
    |                  OK-----------| Replace valve [20].          |
    |                                 -----------------------------
**************************************************
* Check continuity between terminals 22 and 23 on *
* connector H1023A. IF                            *
**************************************************
    |     |                           -----------------------------
    OK    NOT OK--------------------| Replace sensor [23].         |
    |                                 -----------------------------
    |
    |                                 -----------------------------
    |-------------------------------| Replace controller [18].     |
                                      -----------------------------
```

Chart 101

```
*************************************--------------------------------
* SELECTOR [17] IN AUTO RANGE.      *| GROUND EQUIPMENT REQUIRED    |
* AIR AND DUCT WARNING LIGHTS       *|------------------------------|
* ILLUMINATED. DUCT INDICATOR [4]   *| DESCRIPTION          PART NO |
* READING LESS THAN 0°C.            *|------------------------------|
*************************************| ELECTRONIC MULTIMETER        |
                                     --------------------------------

****************************************************
* On panel 2-214, place COND VALVE switch in ON    *
* position, selector [17] in position 3 in AUTO range*
* Measure voltage between terminals F and B of test *
* connector on controller [18]. Voltage 115 VAC. IF *
****************************************************
    |     |           ------------------------------------------
    |     |          | Measure voltage between terminals B and J of |
    OK    NOT OK--| test connector H1068 on selector [17].     |
    |                | Voltage 115 VAC.                          |
    |                 ------------------------------------------
    |     ------------------------  |    |    -------------------
    |     | Replace selector [17]|--OK   NOT OK-| Replace relay [9]|
    |     ------------------------             -------------------
****************************************************
* On same test connector, check that voltage between*
* terminals E and C is + 10 VDC, A and C is - 10 VDC*
* IF                                               *
****************************************************
    |     |                                 -----------------------------
    OK    NOT OK----------------------| Replace controller [18].   |
    |                                       -----------------------------
****************************************************
* On same test connector, check that voltage between*
* terminals K and C is greater than + 8 VDC. IF    *
****************************************************
    |     |          ----------------------------------------------
    OK    NOT OK-| Selector [17] at 0 in AUTO range. On same test |
    |            | connector, check that voltage between terminals |
    |            | P and C is less than 200 m VDC.                 |
    |             ----------------------------------------------
    |              |                    |
    |              |    --------------  |        -------------------
    |              OK--| Ref. Sheet 2|  NOT OK-| Replace sensor [23]|
    |                   --------------           -------------------
****************************************************
* On same test connector, check that voltage between*
* terminals P and C is greater than 1.2 VDC. IF    *
****************************************************
    |     |                                      -------------------
    OK    NOT OK---------------------------| Replace sensor [23]|
    |                                            -------------------
```

Chart 102 (Sheet 1 of 2)

```
    |
    |
**************************************
* Remove controller [18].            *
* On connector H1023A, check         *
* continuity between terminals 34    *
* and 35. IF                         *
**************************************
    |     |                          ----------------------------------------
 0 OHM    INFINITY----------| Restore wiring to correct condition  |
    |                       | Ref. WDM 21-61-01.                   |
    |                          ----------------------------------------
**************************************
* On connector H1023A, check that    *
* resistance between terminals 25 and*
* 26 is greater than 350 Ω. IF       *
**************************************
    |     |                          ----------------------------------------
    OK    NOT OK------------| Replace controller [18].             |
    |                          ----------------------------------------
    |
    |                          ----------------------------------------
    |-----------------------| Replace valve [20].                  |
                               ----------------------------------------
```

Chart 102 (Sheet 2 of 2)

```
*************************************-------------------------------
* SELECTOR [17] IN AUTO RANGE       *| GROUND EQUIPMENT REQUIRED   |
* INEFFECTIVE AT ALTITUDE LESS THAN *|-----------------------------|
* 30 000 FT. DUCT INDICATOR [4]     *| DESCRIPTION         PART NO |
* READING REMAINS AT + 80°C.        *|-----------------------------|
*************************************| ELECTRONIC MULTIMETER       |
*************************************-------------------------------
* COND VALVE switch in ON position.  *
* Selector [17] at 0 in AUTO range.  *
* On controller [18] test connector, *
* check that voltage between         *
* terminals K and C is less than     *
* - 8 VDC. IF                        *
**************************************
    |     |      ---------------
    OK    NOT OK--| Ref. Sheet 2 |
    |            ---------------
**************************************
* On same connector, check that      *
* voltage between terminals R andC  *
* is less than + 1 VDC. IF           *
**************************************
    |     |     ------------------------------------------------------
    OK    NOT OK--| Remove comparison unit [19] and check              |
    |             | continuity between terminals 52 and 21, and 53    |
    |             | and 20 of the unit connector.                      |
    |             ------------------------------------------------------
    |                   |  |        ---------------------------------
    |                   OK NOT OK---| Replace comparison unit [19]  |
    |                   |           ---------------------------------
    |                   |
    |                   |           ---------------------------------
    |                   |-----------| Replace sensor [21].          |
    |                               ---------------------------------
    |
    |                               ---------------------------------
    |-------------------------------| Replace controller [18].      |
                                    ---------------------------------
```

Chart 103 (Sheet 1 of 2)

```
****************************************
* Selector [17] at 3 in AUTO range.    *
* On controller [18] test connector,   *
* check that voltage between           *
* terminals R and C is less than       *
* 5.3 VDC. IF                          *
****************************************
    |      |
    |      |    ------------------------------------------------------
   OK     NOT OK--| Remove comparison unit [19] and check               |
    |               | continuity between terminals 52 and 21, and 53   |
    |               | and 20 of unit connector.                         |
    |               ------------------------------------------------------
    |                       |    |
    |                       |    |    ----------------------------------
    |                      OK   NOT OK--| Replace comparison unit [19]. |
    |                       |            ----------------------------------
    |                       |
    |                       |            ----------------------------------
    |                       |------------| Replace sensor [21].          |
    |                                    ----------------------------------
    |
    |                                    ----------------------------------
    |------------------------------------| Replace controller [18].      |
                                         ----------------------------------
```

Chart 103 (Sheet 2 of 2)

```
***********************************-------------------------------
* SELECTOR [17] IN AUTO RANGE       *| GROUND EQUIPMMENT REQUIRED |
* INEFFECTIVE AT ALTITUDE LESS THAN *|----------------------------|
* OR GREATER THAN 30 000 FT. DUCT   *| DESCRIPTION        PART NO |
* INDICATOR [4] READING REMAINS AT  *|----------------------------|
* + 35°C.                           *| ELECTRONIC MULTIMETER      |
***********************************-------------------------------
*****************************************************
* COND VALVE switch in ON position. Selector [17] at*
* 0 in AUTO range. On selector [17] test connector  *
* H1068, check that voltage between terminals G and *
* H is greater than 1 VDC. IF                       *
*****************************************************
    |     |
    |     |                        ------------------------
   OK    NOT OK-----------------------| Replace selector [17].  |
    |                              ------------------------
*****************************************************
* On controller [18] test connector, check that     *
* voltage between terminals S and C is less than    *
* 7.5 VDC. IF                                       *
*****************************************************
    |     |         ---------------------------------------
    |     |        | Remove comparison unit [19] and check |
   OK    NOT OK--| continuity between terminals 48 and 13, and |
    |              | 49 and 12 of unit connector.           |
    |             ---------------------------------------
    |                      |  |     -------------------------
    |                     OK NOT OK-| Replace comparison unit [19]. |
    |                      |          -------------------------
    |                      |
    |                      |          -------------------------
    |                      |---------| Replace sensor [22].       |
    |                                 -------------------------
    |
    |                                 -------------------------
    |----------------------------| Replace controller [18].   |
                                      -------------------------
```

Chart 104

```
*************************************-----------------------------
* SELECTOR [17] IN AUTO RANGE       *| GROUND EQUIPMENT REQUIRED  |
* INEFFECTIVE AT ALTITUDE LESS THAN *|----------------------------|
* 30 000 FT. DUCT INDICATOR [4]     *| DESCRIPTION        PART NO |
* READING REMAINS AT + 5°C.         *|----------------------------|
*************************************| ELECTRONIC MULTIMETER      |
                                     -----------------------------

*********************************************************
* COND VALVE switch ON. Selector [17] at 3 in AUTO range.*
* On controller [18] test connector, check that voltage  *
* between terminals S and C is greater than 200 m VDC. IF*
*********************************************************
    |     |                          -----------------------------
    OK    NOT OK---------------------| Replace sensor [22].       |
    |                                -----------------------------
*********************************************************
* On same connector, check that voltage between terminals*
* K and C is greater than + 8 VDC. IF                    *
*********************************************************
    |     |           --------------------------------------------------
    OK    NOT OK--| Selector [17] at 0 in AUTO range. On same       |
    |             | connector, check that voltage between terminals|
    |             | R and C is greater than 50 m VDC.               |
    |             --------------------------------------------------
    |                  |    |        -----------------------------
    |                  OK   NOT OK----| Replace sensor [21].       |
    |                  |              -----------------------------
    |             --------------------------------------------------
    |             | Selector [17] at 3 in AUTO range. On test       |
    |             | connector H1068, check that voltage between     |
    |             | terminals F and G is less than 0.5 VDC.         |
    |             --------------------------------------------------
    |                  |    |        -----------------------------
    |                  OK   NOT OK----| Replace selector [17].     |
    |                  |              -----------------------------
    |                  |              -----------------------------
    |                  |--------------| Replace controller [18].   |
    |                                 -----------------------------
*********************************************************
* On same connector, check that voltage between terminals*
* R and C is greater than 0.4 VDC.                       *
*********************************************************
    |     |                          -----------------------------
    OK    NOT OK---------------------| Replace sensor [21].       |
    |                                -----------------------------
    |
```

Chart 105 (Sheet 1 of 2)

```
     |
     |
****************************************************
* Selector [17] at 3 in AUTO range. On selector [17]*
* connector H1068, check that voltage between      *
* terminals F and G is less than 0.5 VDC. IF       *
****************************************************
     |      |
     |      |                 ----------------------------------
    OK     NOT OK-----------------| Replace selector [17].         |
     |                        ----------------------------------
     |
     |                        ----------------------------------
     |----------------------------| Replace controller [18].       |
                              ----------------------------------
```

Chart 105 (Sheet 2 of 2)

```
*************************************-------------------------------
* SELECTOR [17] IN AUTO RANGE       *| GROUND EQUIPMENT REQUIRED    |
* INEFFECTIVE AT ALTITUDE GREATER   *|------------------------------|
* THAN 30 000 FT. DUCT INDICATOR [4] *| DESCRIPTION          PART NO |
* READING REMAINS AT + 80°C.        *|------------------------------|
*************************************| ELECTRONIC MULTIMETER        |
                                      -------------------------------

****************************************************
* COND VALVE switch in ON position. Disconnect     *
* pressure switch H1032 connector. Place a shunt   *
* across pins B and C of connector H1032A. On      *
* controller [18] test connector, check that voltage*
* between terminals N and C is less than 1 VDC. IF *
****************************************************
     |     |
     |     |                      -------------------------------
     OK    NOT OK----------------| Replace transducer [24].     |
     |                            -------------------------------
     |
     |                            -------------------------------
     |---------------------------| Replace valve [20].          |
                                  -------------------------------
```

Chart 106

```
*************************************-------------------------------
* SELECTOR [17] IN AUTO RANGE         *| GROUND EQUIPMENT REQUIRED   |
* INEFFECTIVE AT ALTITUDE GREATER     *|-----------------------------|
* THAN 30 000 FT. DUCT INDICATOR [4]  *| DESCRIPTION         PART NO |
* READING REMAINS AT - 30°C.          *|-----------------------------|
***************************************| ELECTRONIC MULTIMETER       |
                                       -------------------------------

****************************************************
* COND VALVE switch in ON position. Selector [17] at*
* 3 in AUTO range. On controller [18] test connector*
* check that voltage between terminals K and C is   *
* + 8 VDC. IF                                       *
****************************************************
    |     |    ----------------------------------------------
    |     |    | Selector [17] at 0 in AUTO range. On controller|
    OK    NOT OK--| [18] test connector, check that voltage between|
    |          | terminals R and C is greater than + 50 m VDC.  |
    |          ----------------------------------------------
    |                |    |        -----------------------------
    |                OK   NOT OK----| Replace sensor [21].       |
    |                |               =============================
    |                |               -----------------------------
    |                |--------------| Replace controller [18].   |
    |                                -----------------------------
    |
****************************************************
* On same connector, check that voltage between     *
* terminals R and C is greater than 0.4 VDC. IF     *
****************************************************
    |     |                          -----------------------------
    OK    NOT OK---------------------| Replace sensor [21].       |
    |                                -----------------------------
    |                                -----------------------------
    |--------------------------------| Replace controller [18].   |
                                     -----------------------------
```

Chart 107

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```
*************************************-------------------------------
* SELECTOR [17] IN AUTO RANGE        *| GROUND EQUIPMENT REQUIRED   |
* INEFFECTIVE AT ALTITUDE GREATER    *|-----------------------------|
* THAN 30 000 FT. DUCT INDICATOR [4] *| DESCRIPTION         PART NO |
* READING REMAINS AT - 10°C.         *|-----------------------------|
**************************************| ELECTRONIC MULTIMETER       |
                                       -------------------------------

*****************************************************
* COND VALVE switch in ON position. Selector [17] at*
* 3 in AUTO range. On controller [18] test connector*
* check that voltage between terminals S and C is   *
* + 200 m VDC. IF                                   *
*****************************************************
     |     |
     |     |                          -------------------------------
     OK    NOT OK---------------------| Replace sensor [22].        |
     |                                -------------------------------
     |
*****************************************************
* On selector [17] test connector H1608, check that *
* voltage between terminals F and G is less than    *
* 0.5 VDC. IF                                       *
*****************************************************
     |     |
     |     |                          -------------------------------
     OK    NOT OK---------------------| Replace selector [17].      |
     |                                -------------------------------
     |
     |                                -------------------------------
     |--------------------------------| Replace controller [18].    |
                                      -------------------------------
```

Chart 108

```
****************************************------------------------------
* GROUP 3 AND 4 DUCT INDICATOR [4]    *| GROUND EQUIPMENT REQUIRED   |
* READINGS DIFFERENT.                 *|-----------------------------|
* COMPARATOR INDICATOR LIGHT          *| DESCRIPTION         PART NO |
* ILLUMINATED.                        *|-----------------------------|
***************************************| ELECTRONIC MULTIMETER       |
                                        ------------------------------

*****************************************************
* Switch [27] in ON POSITION. On comparison unit    *
* [19] test connector, check that voltage between   *
* terminal F and aircraft ground is 115 VAC. IF     *
*****************************************************
    |     |      ---------------------------------------------------
    OK    NOT OK--| Open panel 2-214. Check that voltage between   |
    |             | terminal 2 on back of switch [27] and aircraft |
    |             | ground is 115 VAC.                             |
    |              ---------------------------------------------------
    |                  |    |      --------------------------------
    |                  OK   NOT OK--| Replace circuit breaker [16].|
    |                  |            --------------------------------
    |                  |            --------------------------------
    |                  |------------| Replace switch [27].         |
    |                               --------------------------------
    |
*****************************************************
* Connect ground air supply unit and start up groups*
* 3 and 4. Place group 3 and 4 CROSS BLEED switches *
R * 3H865 and 4H865 in OPEN position. Group 3 and 4    *
R * air conditioning valves are open. Cross bleed      *
* magnetic indicators display continuity. Place     *
* switch [27] in FAILED position. On comparison unit*
* [19] test connector, check continuity between     *
* terminal 6 and aircraft ground. IF                *
*****************************************************
    |     |
    |     |                         --------------------------------
  0 OHM   INFINITY-----------------| Replace the 2 relays [10].   |
    |                               --------------------------------
    |
    |                               --------------------------------
    |------------------------------| Replace comparison unit [19].|
                                    --------------------------------
```

Chart 109

```
**************************************-------------------------------
* NOT POSSIBLE TO CONTROL TEMPERATURE*| GROUND EQUIPMENT REQUIRED  |
* WITH GROUP 4 SELECTOR [17] AT      *|----------------------------|
* ALTITUDE GREATER THAN 30 000 FT.   *| DESCRIPTION        PART NO |
* GROUPS SEPARATED BY PLACING SWITCH *|----------------------------|
* [27] IN FAILED POSITION.           *| ELECTRONIC MULTIMETER      |
* GROUP 3 SELECTOR [17] IN STAND BY  *-------------------------------
* RANGE, GROUP 4 SELECTOR [17] IN    *
* AUTO RANGE.                        *
* GROUPS FUNCTION CORRECTLY.         *
**************************************

*****************************************************
* Disconnect pressure switch H1034 connector. Place *
* a shunt across terminals B and C of connector     *
* H1034A. On group 3 controller [18] test  connector*
* check that voltage between terminals N and C is   *
* less than 1 VDC. IF                               *
*****************************************************
    |     |
    |     |                ------------------------------------
    OK    NOT OK-----------| Replace group 3 transducer [24]. |
    |                      ------------------------------------
    |
    |                      ------------------------------------
    |----------------------| Replace group 3 controller [18]. |
                           ------------------------------------
```

Chart 110

```
**************************************-------------------------------
* NOT POSSIBLE TO CONTROL TEMPERATURE*| GROUND EQUIPMENT REQUIRED   |
* WITH GROUP 4 SELECTOR [17] AT      *|-----------------------------|
* ALTITUDE GREATER THAN 30 000 FT.   *| DESCRIPTION        PART NO  |
* GROUPS SEPARATED BY PLACING SWITCH *|-----------------------------|
* [27] IN FAILED POSITION.           *| ELECTRONIC MULTIMETER       |
* GROUP 3 SELECTOR [17] IN AUTO RANGE*-------------------------------
* GROUP 4 SELECTOR [17] IN STAND BY  *
* RANGE.                             *
* GROUPS FUNCTION CORRECTLY.         *
**************************************

****************************************************
* Disconnect pressure switch H1035 connector. Place *
* a shunt between terminals B and C of connector    *
* H1035A. On group 4 controller [18] test connector *
* check that voltage between terminals N and C is   *
* less than 1 VDC. IF                               *
****************************************************
    |     |
    |     |                       ----------------------------------
    OK    NOT OK------------------| Replace group 4 transducer [24]|
    |                             ----------------------------------
    |
    |                             ----------------------------------
    |-----------------------------| Replace group 4 controller [24]|
                                  ----------------------------------
```

Chart 111

```
*************************************-------------------------------
* ON PANEL 4-211, AIR WARNING LIGHT  *| GROUND EQUIPMENT REQUIRED  |
* ILLUMINATES AND ON PANEL 2-214,    *|----------------------------|
* GROUP 3 DUCT WARNING LIGHT         *| DESCRIPTION        PART NO |
* ILLUMINATES FOLLOWED BY GROUP 4    *|----------------------------|
* DUCT WARNING LIGHT.                *| ELECTRONIC MULTIMETER      |
* GROUP 4 DUCT INDICATOR [4] READING *-------------------------------
* GREATER THAN 120°C.                *
*************************************

****************************************************
* Remove group 4 controller [18]. On comparison unit*
* [19] test connector, check continuity between    *
* terminal L and aircraft ground. IF               *
****************************************************
     |     |
     |     |                          ---------------------------------
    OK    NOT OK----------------------| Replace group 4 sensor [23].  |
     |                                ---------------------------------
     |
     |                                ---------------------------------
     |--------------------------------| Replace group 4 controller [18]|
                                      ---------------------------------
```

Chart 112

```
**************************************-------------------------------
* AIR AND GROUP 3 DUCT WARNING LIGHTS*| GROUND EQUIPMENT REQUIRED   |
* ILLUMINATE, FOLLOWED BY GROUP 4    *|-----------------------------|
* DUCT WARNING LIGHT. GROUP 4 DUCT   *| DESCRIPTION         PART NO |
* INDICATOR [4] READING LESS THAN 0°C*|-----------------------------|
**************************************| ELECTRONIC MULTIMETER       |
                                       -----------------------------

*******************************************************************
* Group 4 COND VALVE switch in ON position, group 4 selector [17] *
* at 3 in AUTO range. On group 4 controller [18] test connector,   *
* check that voltage between terminals F and B is 115 VAC. IF      *
*******************************************************************
  |   |          --------------------------------------------------
  OK  NOT OK-| On group 4 selector [17] test connector H1071 check |
  |          | that voltage between terminals B and J is 115 VAC.  |
  |           --------------------------------------------------
  |                |     |        ---------------------------------
  |                OK    NOT OK-----| Replace group 4 relay [9].    |
  |                |                ---------------------------------
  |                |                ---------------------------------
  |                |----------------| Replace group 4 selector [17].|
  |                                 ---------------------------------
*************************************************************
* On same connector, check that voltage between terminals E  *
* and C is + 10 VDC, and terminals A and C is - 10 VDC. IF   *
*************************************************************
  |   |                            --------------------------------
  OK  NOT OK-----------------------| Replace group 4 controller [18]|
  |                                --------------------------------
*************************************************************
* On same connector, check that voltage between terminals K  *
* and C is greater than + 8 VDC. IF                          *
*************************************************************
  |   |           -------------------------------------------------
  OK  NOT OK--| Group 4 selector [17] at 0 in AUTO range. On group |
  |           | 4 controller [18] test connector, check that       |
  |           | voltage between terminals P and C is greater than  |
  |           | 200 m VDC.                                         |
  |           -------------------------------------------------
  |  -------------      |      |      ---------------------------------
  |  |Ref. Sheet 2|-----OK     NOT OK-| Replace group 4 sensor [23].|
  |  -------------                    ---------------------------------
*************************************************************
* On same connector, check that voltage between terminals P  *
* and C is greater than 1.2 VDC. IF                          *
*************************************************************
  |   |                              ------------------------------
  OK  NOT OK-------------------------| Replace group 4 sensor [23].|
  |                                  ------------------------------
```

Chart 113 (Sheet 1 of 2)

```
    |
    |
*****************************************************
* Remove group 4 controller [18]. On connector      *
* H1026A, check continuity between terminals 34 and *
* 35. IF                                            *
*****************************************************
    |     |
    |     |                   ---------------------------------
    OK    NOT OK--------------| Restore wiring to correct     |
    |                         | condition.                    |
    |                         | Ref. WDM 21-63-01.            |
    |                         ---------------------------------
    |
*****************************************************
* On connector H1026A, check that resistance between*
* terminals 25 and 26 is greater than 350 Ω. IF     *
*****************************************************
    |     |
    |     |              --------------------------------------
    OK    NOT OK---------| Replace group 4 controller [18].   |
    |                    --------------------------------------
    |
    |                    --------------------------------------
    |--------------------| Replace group 4 valve [20].        |
                         --------------------------------------
```

Chart 113 (Sheet 2 of 2)

```
**************************************---------------------------------
* AIR AND GROUP 3 DUCT WARNING LIGHTS*| GROUND EQUIPMENT REQUIRED    |
* ILLUMINATE. GROUP DUCT INDICATOR   *|------------------------------|
* [4] READING GREATER THAN 120°C.    *| DESCRIPTION          PART NO |
* WITH SWITCH [27] IN FAILED POSITION*|------------------------------|
* GROUP 3 FUNCTIONS CORRECTLY IN     *| ELECTRONIC MULTIMETER        |
* STAND BY RANGE.                    *--------------------------------
**************************************

************************************************************
* Remove group 3 controller [18]. Check isolation between *
* connector H1025A terminal 25 and aircraft ground. IF    *
************************************************************
    |     |
    |     |                ------------------------------------------
   OK    NOT OK-------- | Disconnect group 3 valve [20] connector  |
    |                   | and carry out the same test.             |
    |                   ------------------------------------------
    |                      |     |
    |                      |     |       ----------------------------
    |                     OK    NOT OK--| Restore wiring between    |
    |                      |            | group 3 controller [18]   |
    |                      |            | and group 3 valve [20] to|
    |                      |            | correct condition.        |
    |                      |            | Ref. WDM 21-63-01.        |
    |                      |            ----------------------------
    |                      |         ----------------------------
    |                      |---------| Replace group 3 valve [20]. |
    |                                ----------------------------
    |
************************************************************
* Check continuity between terminals 22 and 23 of connector*
* H1025A. IF                                               *
************************************************************
    |     |
    |     |                          ------------------------------
   OK    NOT OK--------------------| Replace group 3 sensor [23].|
    |                                ------------------------------
    |
    |                       ------------------------------------
    |-------------------------| Replace group 3 controller [18]. |
                              ------------------------------------
```

Chart 114

```
*************************************-------------------------------
* AIR AND GROUP 3 DUCT WARNING LIGHTS*| GROUND EQUIPMENT REQUIRED   |
* ILLUMINATE. GROUP 3 DUCT INDICATOR *|-----------------------------|
* [4] READING LESS THAN 0°C.         *| DESCRIPTION        PART NO  |
* WITH SWITCH [27] IN FAILED POSITION*|-----------------------------|
* GROUP 3 FUNCTIONS CORRECTLY IN     *| ELECTRONIC MULTIMETER       |
* STAND BY RANGE.                    *-------------------------------
*************************************
*******************************************************************
* Group 3 COND VALVE switch in ON position, group 3 selector [17] *
* at 3 in AUTO range. On group 3 controller [18] test connector,  *
* check that voltage between terminals F and B is 115 VAC. IF     *
*******************************************************************
    |      |       -------------------------------------------------
    OK     NOT OK---| On group 3 selector [17] test connector H1070|
    |               | check that voltage between terminals B and J |
********************| is 115 VAC.                                  |
* On same connector*-----------------------------------------------
* check that volta-*    |   |           -----------------------------
* ge between termi-*    OK  NOT OK------| Replace group 3 relay [9].|
* nals E and C is  *    |               -----------------------------
* + 10 VDC, and A  *    |       --------------------------------------
* and C is - 10 VDC*    |-------| Replace group 3 selector [17].     |
* IF               *            --------------------------------------
*******************
    |     |                     --------------------------------------
    OK    NOT OK----------------| Replace group 3 controller [18].   |
    |                           --------------------------------------
*******************************************************************
* On same connector, check that voltage between terminals K and C *
* is greater than + 8 VDC. IF                                     *
*******************************************************************
    |     |            ---------------------------------------------
    OK    NOT OK---| Group 3 selector [17] at 0 in AUTO range. On  |
    |              | same connector, check that voltage between    |
    |              | terminals P and C is greater than 115 VAC.    |
    |              ---------------------------------------------
    |   ----------------    |    |        ----------------------------
    |   | Ref. Sheet 2 |--OK    NOT OK--| Replace group 3 sensor [23]|
    |   ----------------                ----------------------------
*******************************************************************
* On same connector, check that voltage between terminals P and C *
* is greater than 1.2 VDC. IF                                     *
*******************************************************************
    |     |                           ----------------------------
    OK    NOT OK----------------------| Replace group 3 sensor [23]|
    |                                 ----------------------------
```

Chart 115 (Sheet 1 of 2)

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```
    |
    |
****************************************************
* Remove group 3 controller [18], check continuity   *
* between terminals 34 and 35 of connector H1025A. IF*
****************************************************
    |      |
    |      |                 -------------------------------------
  0 OHM   INFINITY-----------| Restore wiring to correct condition|
    |                        | Ref. WDM 21-63-01.                 |
    |                        -------------------------------------
    |
****************************************************
* On same connector, check that resistance between   *
* terminals 25 and 26 is greater than 350 Ω. IF      *
****************************************************
    |      |
    |      |                 -------------------------------------
    OK    NOT OK-------------| Replace group 3 controller [18].   |
    |                        -------------------------------------
    |
    |                        -------------------------------------
    |------------------------| Replace group 3 valve [20].        |
                             -------------------------------------
```

Chart 115 (Sheet 2 of 2)

```
***************************************-----------------------------
* AIR AND GROUP 4 DUCT WARNING LIGHTS*| GROUND EQUIPMENT REQUIRED  |
* ILLUMINATE. GROUP 4 DUCT INDICATOR *|----------------------------|
* READING GREATER THAN 120°C.        *| DESCRIPTION        PART NO |
* WITH SWITCH [27] IN FAILED POSITION*|----------------------------|
* GROUP 4 FUNCTIONS CORRECTLY IN     *| ELECTRONIC MULTIMETER      |
* STAND BY RANGE.                    *-----------------------------
***************************************
*********************************************************************
* Group 4 COND VALVE switch in ON position, group 4 selector [17]  *
* at 3 in AUTO range. On group 4 controller [18] test connector,   *
* check that voltage between terminals F and B is 115 VAC. IF      *
*********************************************************************
    |     |          --------------------------------------------
    OK    NOT OK-----------| On group 4 selector [17] test             |
    |                      | connector H1071, check that voltage       |
*************************  | between terminals B and J is 115 VAC.     |
* On same connector,    *  --------------------------------------------
* check that voltage    *   |  |        -----------------------------
* between terminals E and*  OK NOT OK-| Replace group 4 relay [9]. |
* C is + 10 VDC and     *   |           -----------------------------
* between A and C is    *   |        --------------------------------
* - 10 VDC. IF          *   |------| Replace group 4 selector [17].|
*************************            --------------------------------
    |     |                         -----------------------------------
    OK    NOT OK------------------| Replace group 4 controller [18].|
    |                               -----------------------------------
*********************************************************************
* On same connector, check that voltage between terminals K and C  *
* is greater than + 8 VDC. IF                                      *
*********************************************************************
    |   |       -------------------------------------------------------
    OK  NOT OK---| Group 4 selector [17] at 0 in AUTO range. On         |
    |            | group 4 controller [18] test connector, check        |
    |            | that voltage between terminals P and C is            |
    |            | greater than 200 m VDC.                              |
    |            -------------------------------------------------------
    |    ----------------  |  |      -------------------------------
    |    | Ref. Sheet 2 |--OK NOT OK-| Replace group 4 sensor [23].|
    |    ----------------              -------------------------------
*********************************************************************
* On same connector, check that voltage between terminals P and C  *
* is greater than 1.2 VDC. IF                                      *
*********************************************************************
    |     |                           -------------------------------
    OK    NOT OK---------------------| Replace group 4 sensor [23].|
    |                                 -------------------------------
```

Chart 116 (Sheet 1 of 2)

```
    |
    |
*****************************************************
* Remove group 4 controller [18]. On connector      *
* H1026A, check continuity between terminals 34 and *
* 35. IF                                            *
*****************************************************
    |     |
    |     |                    --------------------------------
    OK    NOT OK--------------| Restore wiring to correct    |
    |                         | condition.                   |
    |                         | Ref. WDM 21-63-01.           |
    |                          --------------------------------
    |
*****************************************************
* On same connector, check that resistance between  *
* terminals 25 and 26 is greater than 350 Ω. IF     *
*****************************************************
    |     |
    |     |                    --------------------------------
    OK    NOT OK--------------| Replace group 4 controller   |
    |                         | [18].                        |
    |                          --------------------------------
    |
    |
    |                          --------------------------------
    |-------------------------| Replace group 4 valve [20].  |
                               --------------------------------
```

Chart 116 (Sheet 2 of 2)

```
**************************************-------------------------------
* AIR AND GROUP 4 DUCT WARNING LIGHTS*| GROUND EQUIPMENT REQUIRED  |
* ILLUMINATE. GROUP 4 DUCT INDICATOR *|----------------------------|
* [4] READING LESS THAN 0°C.         *| DESCRIPTION        PART NO |
* WITH SWITCH [27] IN FAILED POSITION*|----------------------------|
* GROUP 4 FUNCTIONS CORRECTLY IN     *| ELECTRONIC MULTIMETER      |
* STAND BY RANGE.                    *-----------------------------
**************************************

*******************************************************************
* Remove group 4 controller [18]. On connector H1026A, check      *
* isolation between terminal 25 and aircraft ground. IF           *
*******************************************************************
    |     |
    |     |                  -----------------------------------------
   OK    NOT OK--------------| Disconnect group 4 valve [20] connector |
    |                        | and carry out the same test.            |
    |                        -----------------------------------------
    |                         |  |
    |                         |  |         ----------------------------
    |                        OK NOT OK----| Restore the wiring between|
    |                         |           | group 4 controller [18]   |
    |                         |           | and valve [20] to correct |
    |                         |           | condition.                |
    |                         |           | Ref. WDM 21-63-01.        |
    |                         |           ----------------------------
    |                         |           ----------------------------
    |                         |-----------| Replace group 4 valve [20]|
    |                                     ----------------------------
    |

*******************************************************************
* On same connector, check continuity between terminals 22 and 23. *
* IF                                                               *
*******************************************************************
    |     |
    |     |                    -----------------------------------
   OK    NOT OK----------------| Replace group 4 sensor [23].     |
    |                          -----------------------------------
    |
    |                          -----------------------------------
    |--------------------------| Replace group 4 controller [18]. |
                               -----------------------------------
```

Chart 117

```
*************************************-------------------------------
* GROUP 2 SWITCH [26] IN FAILED     *| GROUND EQUIPMENT REQUIRED  |
* POSITION.                         *|----------------------------|
* GROUP SUPPLY MAGNETIC INDICATORS  *| DESCRIPTION        PART NO |
* DISPLAY STRIPES.                  *|----------------------------|
*************************************| ELECTRONIC MULTIMETER      |
                                      ------------------------------

*****************************************************
* On panel 2-214, check diode [25]. IF              *
*****************************************************
    |     |
    |     |                              -------------------------------
    OK    NOT OK-------------------------| Replace diode [25].         |
    |                                    -------------------------------
    |
    |                                    -------------------------------
    |------------------------------------| Replace group 2 switch [26]. |
                                         -------------------------------
```

Chart 118

```
***************************************-------------------------------
* DUCT INDICATOR [4] FUNCTIONS        *| GROUND EQUIPMENT REQUIRED   |
* CORRECTLY.                          *|-----------------------------|
* INDICATOR [28] DOES NOT FUNCTION    *| DESCRIPTION         PART NO |
* CORRECTLY.                          *|-----------------------------|
***************************************| ELECTRONIC MULTIMETER       |
                                       -------------------------------

*****************************************************
* Disconnect indicator [28] connector H1015A. On    *
* power side of connector, check that voltage       *
* between terminals E and F is 26 VAC. IF           *
*****************************************************
     |     |
     |     |                   ------------------------------------
    26V   0V-------------------| Replace circuit breaker [31].    |
     |                         ------------------------------------
     |
*****************************************************
* Cross connect group 1 and group 2 indicators [28].*
* Connect ground air supply and start up groups 1   *
* and 2. Group 1 indicator [28] functions correctly.*
* IF                                                *
*****************************************************
     |     |
     |     |                   ------------------------------------
    OK    NOT OK---------------| Replace group 1 indicator [28].  |
     |                         ------------------------------------
     |
     |
     |                         ------------------------------------
     |-------------------------| Replace group 1 valve [20].      |
                               ------------------------------------
```

Chart 119

```
*************************************
* CAU IN INDICATOR [4] READING      *
* MAXIMUM.                          *
*************************************

***********************************************
* Cross connect group 1 and group 2 indicators *
* [4]. Group 1 CAU IN indicator [4] reading    *
* remains maximum. IF                          *
***********************************************
    |     |
    |     |
    |     |                    --------------------------------
    OK    NOT OK--------------| Replace group 1 indicator [4].|
    |                          --------------------------------
    |
    |                          --------------------------------
    |-------------------------| Replace group 1 sensor [7].   |
                               --------------------------------
```

Chart 120

```
**************************************
* DUCT INDICATOR [4] READING MAXIMUM *
**************************************

*****************************************************
* Cross connect group 1 and group 2 indicators [4]. *
* Group 1 DUCT indicator [4] reading remains        *
* maximum. IF                                       *
*****************************************************
     |     |
     |     |                    ---------------------------------
     OK    NOT OK---------------| Replace group 1 indicator [4].|
     |                          ---------------------------------
     |
     |
     |                          ---------------------------------
     |--------------------------| Replace group 1 sensor [6].   |
                                ---------------------------------
```

Chart 121

```
**************************************-------------------------------
* FLAG APPEARS ON INDICATOR [4].     *| GROUND EQUIPMENT REQUIRED   |
**************************************|-----------------------------|
                                      | DESCRIPTION         PART NO |
                                      |-----------------------------|
                                      | ELECTRONIC MULTIMETER       |
                                      -------------------------------

***********************************************
* Disconnect indicator [4] connector 1D164A. On*
* power side of connector, check that voltage  *
* between terminals A and B is 28 V. IF        *
***********************************************
    |     |
    |     |                         ---------------------------------
    OK    NOT OK--------------------| Replace circuit breaker [2].  |
    |                               ---------------------------------
    |
    |                               ---------------------------------
    |-------------------------------| Replace indicator [4].        |
                                    ---------------------------------
```

Chart 122

```
*************************************
* INDICATOR [3] READING MAXIMUM.    *
*************************************

****************************************************
* Cross connect indicators 1D163 and 2D163 [3].    *
* Indicator 1D163 reading remains maximum. IF      *
****************************************************
    |     |
    |     |                          -------------------------------
   OK    NOT OK-------------------| Replace indicator 1D163 [3]. |
    |                                -------------------------------
    |
    |
    |                                -------------------------------
    |------------------------------| Replace group 1 sensor [5].  |
                                     -------------------------------
```

Chart 123

```
***********************************-------------------------------
* INDICATOR [3] READING MINIMUM      *| GROUND EQUIPMENT REQUIRED |
**************************************|---------------------------|
                                      | DESCRIPTION       PART NO |
                                      |---------------------------|
                                      | ELECTRONIC MULTIMETER     |
                                      -----------------------------

**************************************************
* Disconnect indicator [3] connector 1D163A and  *
* check that voltage between terminals F and G of *
* connector is 28 VDC. IF                         *
**************************************************
    |     |
    |     |                   ------------------------------
   28V   0V-------------------| Replace circuit breaker [1]. |
    |                         ------------------------------
    |
    |                         ------------------------------
    |-------------------------| Replace indicator [3].     |
                              ------------------------------
```

Chart 124

```
*************************************-------------------------------
* ON THE GROUND, INDICATOR [3]      *| GROUND EQUIPMENT REQUIRED   |
* FUNCTIONS CORRECTLY.              *|-----------------------------|
*************************************| DESCRIPTION        PART NO  |
                                     |-----------------------------|
                                     | ELECTRONIC MULTIMETER       |
                                     -------------------------------

*************************************
* Fan [29] functions correctly. IF  *
*************************************
    |     |
   YES    NO
    |     |
    |   --------------------------------
    |   | Disconnect fan [29] connector |
    |   | H1028A. Check that voltage    |
    |   | between terminals A and B is  |
    |   | 115 V.                        |
    |   --------------------------------
    |       |      |
    |       |      |                  ---------------------------------
    |       OK     NOT OK-------------| Replace circuit breaker [15]. |
    |       |                         ---------------------------------
    |       |
    |       |                         ---------------------------------
    |       |-------------------------| Replace fan [29].             |
    |                                 ---------------------------------
    |
    |                             -------------------------------------
    |-----------------------------| Clean protection grill of fan [29]|
                                  -------------------------------------
```

Chart 125

```
**************************************-------------------------------
* IMPOSSIBLE TO OBTAIN COLD AIR WITH *| GROUND EQUIPMENT REQUIRED  |
* SELECTOR [17] AT - 3 IN STAND BY   *|----------------------------|
* RANGE.                             *| DESCRIPTION        PART NO |
**************************************|----------------------------|
                                      | ELECTRONIC MULTIMETER      |
                                      ------------------------------

**********************************************************
* Selector [17] at - 3 in STAND BY range.                *
* Short-circuit terminals H and K on test connector H1068. *
* On same connector, check that voltage between terminals D *
* and J remains greater than 3V. IF                      *
**********************************************************
    |     |
    |     |                      ------------------------------
   YES   NO----------------------| Replace sensor [30].       |
    |                            ------------------------------
    |
    |
    |                            ------------------------------
    |----------------------------| Replace selector [17].     |
                                 ------------------------------
```

Chart 126

```
**************************************-------------------------------
* IMPOSSIBLE TO OBTAIN WARM AIR WITH *| GROUND EQUIPMENT REQUIRED   |
* SELECTOR [17] AT 6 IN STAND BY     *|-----------------------------|
* RANGE.                             *| DESCRIPTION         PART NO |
**************************************|-----------------------------|
                                      | ELECTRONIC MULTIMETER       |
                                      -------------------------------

***************************************************************
* Selector [17] in STAND BY range.                            *
* On test connector H1068, check that voltage between terminals*
* E and J is 20V. IF                                          *
***************************************************************
    |     |
    |     |           ----------------------------------------
   YES    NO----------| Disconnect selector [17] test connector. |
    |                 | Check that voltage between terminals D and|
    |                 | E is 28V.                                 |
    |                 ----------------------------------------
    |                   |    |
    |                   |    |       --------------------------
    |                  28V   0V-----| Replace circuit breaker [11]|
    |                   |            --------------------------
    |                   |
    |                   |            --------------------------
    |                   |-----------| Replace selector [17].   |
    |                                --------------------------
***************************************************************
* Check that there is resistance between terminals L and M of *
* test connector H1068, and that isolation between terminal M *
* and aircraft ground is correct. IF                          *
***************************************************************
    |     |
    |     |                          --------------------------
   OK    NOT OK---------------------| Replace sensor [30].     |
    |                                --------------------------
    |
***************************************************************
* Check continuity between terminals D and C of test connector *
* H1068.                                                      *
* Circuit is open.                                            *
***************************************************************
    |     |
    |     |                          --------------------------
   YES    NO------------------------| Replace selector [17].   |
    |                                --------------------------
    |                                --------------------------
    |-------------------------------| Replace valve [20].      |
                                     --------------------------
```

Chart 127

4. Component Identification Table

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
[1] Circuit breaker	1-213	1-213	1D161	E 10	24-50-00 R/I	21-61-11
Circuit breaker	5-213	5-213	2D161	D 8	24-50-00 R/I	21-62-11
Circuit breaker	15-215	15-215	3D161	C 3	24-50-00 R/I	21-63-11
[2] Circuit breaker	1-213	1-213	1D162	E 11	24-50-00 R/I	21-61-11
Circuit breaker	5-213	5-213	2D162	D 9	24-50-00 R/I	21-62-11
Circuit breaker	15-215	15-215	3D162	C 4	24-50-00 R/I	21-63-11
Circuit breaker	15-216	15-216	4D162	C 23	24-50-00 R/I	
[3] Ambient temperature indicator	2-214	2-214	1D163		21-61-15 R/I	21-61-11
Ambient temperature indicator	2-214	2-214	2D163		21-61-15 R/I	21-62-11
Ambient temperature indicator	2-214	2-214	3D163		21-61-15 R/I	21-63-11
[4] Dual air conditioning temperature indicator-GRP1	2-214	2-214	1D164		21-61-16 R/I	21-61-11
Dual air conditioning temperature indicator-GRP2	2-214	2-214	2D164		21-61-16 R/I	21-62-11
Dual air conditioning temperature indicator-GRP3	2-214	2-214	3D164		21-61-16 R/I	21-63-11
R Dual air conditioning temperature indicator-GRP4	2-214	2-214	4D164		21-61-16 R/I	21-63-14

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[5] Flt. compt. ambient temp. sensor	211GS	211GS	1D165		21-61-12 R/I	21-61-11
Fwd cabin ambient temp. sensor	C32/34	223	2D165		21-62-12 R/I	21-62-11
Aft cabin ambient temp. sensor	C66/68	241	3D165		21-63-21 R/I	21-63-11
[6] CAU outlet temp. sensor GRP1	575AT		1D166		21-61-34 R/I	21-61-11
CAU outlet temp. sensor GRP2	542AT		2D166		21-61-34 R/I	21-62-11
CAU outlet temp. sensor GRP3	642AT		3D166		21-61-34 R/I	21-63-11
CAU outlet temp. sensor GRP4	635AT		4D166		21-61-34 R/I	21-63-14
[7] CAU inlet temp. sensor GRP1	534BT		1D167		21-61-37 R/I	21-61-11
CAU inlet temp. sensor GRP2	533AT		2D167		21-61-37 R/I	21-62-11
CAU inlet temp. sensor GRP3	633AT		3D167		21-61-37 R/I	21-63-11
CAU inlet temp. sensor GRP4	634BT		4D167		21-61-37 R/I	21-63-14
R [8] Cold air unit - GRP 1	534AT 534CT		1H883		21-12-35 R/I	
R Cold air unit - GRP 2	533BT 533DT		2H883		21-12-35 R/I	
R Cold air unit - GRP 3	633BT 633DT		3H883		21-12-35 R/I	
R Cold air unit - GRP 4	634AT 634CT		4H883		21-12-35 R/I	

	ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
R R	[9] Relay-GRP 1	14-123		1H901		21-10-00 R/I	21-61-12
R R	Relay-GRP 2	14-123		2H901		21-10-00 R/I	21-61-12
R R	Relay-GRP 3	17-123		3H901		21-10-00 R/I	21-63-12
R R	Relay-GRP 4	17-123		4H901		21-10-00 R/I	21-63-15
R R	[10] Relay-GRP3	8-123		3H903		21-60-00 R/I	21-63-17
R R	Relay-GRP4	8-123		4H903		21-60-00 R/I	21-63-17
	[11] Circuit breaker - GRP1	1-213	1-213	H991	F 11	24-50-00 R/I	21-61-12
	Circuit breaker - GRP24	5-213	5-213	H992	B 8	24-50-00 R/I	21-62-12
	Circuit breaker - GRP3	15-215	15-215	H993	D 3	24-50-00 R/I	21-63-12
	Circuit breaker - GRP4	15-216	15-216	H994	C 24	24-50-00 R/I	21-63-15
	[12] Circuit breaker - GRP1	15-215	15-215	H995	D 4	24-50-00 R/I	21-61-13
	Circuit breaker - GRP2	15-216	15-216	H996	D 24	24-50-00 R/I	21-62-13
	Circuit breaker - GRP3	15-215	15-215	H997	E 4	24-50-00 R/I	21-63-13
	Circuit breaker - GRP4	15-216	15-216	H998	E 23	24-50-00 R/I	21-63-16
	[13] Circuit breaker	5-213	5-213	H999	B 9	24-50-00 R/I	21-63-17
	[14] Circuit breaker - GRP1	2-213	2-213	H1000	B 17	24-50-00 R/I	21-61-12
	Circuit breaker - GRP2	4-213	4-213	H1001	E 11	24-50-00 R/I	21-62-12
	Circuit breaker - GRP3	2-213	2-213	H1002	G 16	24-50-00 R/I	21-63-12
	Circuit breaker - GRP4	4-213	4-213	H1003	B 12	24-50-00 R/I	21-63-15

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[15] Circuit breaker - GRP1	2-213	2-213	H1004	B 16	24-50-00 R/I	21-61-12
Circuit breaker - GRP2	4-213	4-213	H1005	D 12	24-50-00 R/I	21-62-12
[16] Circuit breaker - GRP3 & 4	4-213	4-213	H1006	C 11	24-50-00 R/I	21-63-17
[17] Temp. selector - GRP1	2-214	2-214	H1019		21-61-22 R/I	21-61-12
Temp. selector - GRP2	2-214	2-214	H1020		21-61-22 R/I	21-62-12
Temp. selector - GRP3	2-214	2-214	H1021		21-61-22 R/I	21-63-12
Temp. selector - GRP4	2-214	2-214	H1022		21-61-22 R/I	21-63-15
[18] Temp. controller-GRP1	2-215	2-215	H1023		21-61-21 R/I	21-61-12
Temp. controller-GRP2	1-215	1-215	H1024		21-61-21 R/I	21-62-12
Temp. controller-GRP3	1-216	1-216	H1025		21-61-21 R/I	21-63-12
Temp. controller-GRP4	2-216	2-216	H1026		21-61-21 R/I	21-63-15
[19] Comparison unit	10-215	10-215	H1027		21-61-14 R/I	21-61-12
[20] Temp. control valve GRP1			H1036		21-61-31 R/I	21-61-13
Temp. control valve GRP2			H1037		21-61-31 R/I	21-62-13
Temp. control valve GRP3			H1038		21-61-31 R/I	21-63-13
Temp. control valve GRP4			H1039		21-61-31 R/I	21-63-16

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[21] Fuselage mini/maxi temp. sensor - GRP1	233GF	C60/61	H1040		21-61-18 R/I	21-61-12
Fuselage mini/maxi temp. sensor - GRP2	233GF	C60/61	H1041		21-62-31 R/I	21-62-12
Fuselage mini/maxi temp. sensor - GRP3	234GF	C60/61	H1042		21-63-23 R/I	21-63-12
Fuselage mini/maxi temp. sensor - GRP4	234GF	C60/61	H1043		21-63-23 R/I	21-63-15
[22] Ambient temp. sensor GRP1	211GS	211	H1044		21-61-19 R/I	21-61-12
Ambient temp. sensor GRP2	223	C32/34	H1045		21-62-32 R/I	21-62-12
Ambient temp. sensor GRP3	241	C66/68	H1046		21-63-25 R/I	21-63-12
Ambient temp. sensor GRP4	241	C66/68	H1047		21-63-25 R/I	21-63-15
[23] Wing mini/ maxi temp sensor	535AT		H1048		21-61-35 R/I	21-61-13
Wing mini/ maxi temp sensor	543AT		H1049		21-61-35 R/I	21-62-13
Wing mini/ maxi temp sensor	642AT		H1050		21-61-35 R/I	21-63-13
Wing mini/ maxi temp sensor	635AT		H1051		21-61-35 R/I	21-63-15
[24] CAU outlet ice sensor trans- ducer - GRP1	534ET		H1052		21-61-32 R/I	21-61-13

	ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
	CAU outlet ice sensor trans ducer - GRP2	533FT		H1053		21-61-32 R/I	21-62-13
	CAU outlet ice sensor trans- ducer - GRP3	633FT		H1054		21-61-32 R/I	21-63-13
	CAU outlet ice sensor trans- ducer - GRP4	634ET		H1055		21-61-32 R/I	21-63-16
R R	[25] Diode	2-214	2-214	H1060		21-60-00 R/I	21-63-17
	[26] Switch GRP1	2-214	2-214	H1061		21-60-00 R/I	21-63-17
	Switch GRP2	2-214	2-214	H1062		21-60-00 R/I	21-63-17
	[27] Switch - GRP3 or GRP4	2-214	2-214	H1063		21-60-00 R/I	21-63-17
	[28] Temp. cont valve position indicator-GRP1	2-214	2-214	H1015		21-61-17 R/I	21-61-13
	Temp. cont valve position indicator-GRP2	2-214	2-214	H1016		21-61-17 R/I	21-62-13
	Temp. cont valve position indicator-GRP3	2-214	2-214	H1017		21-61-17 R/I	21-63-13
	Temp. cont valve position indicator-GRP4	2-214	2-214	H1018		21-61-17 R/I	21-63-16
	[29] Sampling duct fan - GRP1	211GS		H1028		21-61-13 R/I	21-61-12
	Sampling duct fan - GRP2	223		H1029		21-62-13 R/I	21-62-12
	Sampling duct fan - GRP3	241		H1030		21-63-22 R/I	21-63-12
	Sampling duct fan - GRP4	241		H1031		21-63-22 R/I	21-63-15

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ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[30] Semi-auto temp. sensor GRP1	535AT		H1064		21-61-36 R/I	21-61-13
Semi-auto temp. sensor GRP2	542AT		H1065		21-61-36 R/I	21-62-13
Semi-auto temp. sensor GRP3	642AT		H1066		21-61-36 R/I	21-63-13
Semi-auto temp. sensor GRP4	635AT		H1067		21-61-36 R/I	21-63-16
[31] Circuit breaker - GRP1		13-215	H1007	E 1	24-30-00 R/I	21-61-13
Circuit breaker - GRP2		13-215	H1003	E 2	24-30-00 R/I	21-62-13
Circuit breaker - GRP3		13-216	H1009	E 19	24-30-00 R/I	21-63-13
Circuit breaker - GRP4		13-216	H1010	D 19	24-30-00 R/I	21-63-16

Component Identification
Table 101

TEMPERATURE CONTROL - REMOVAL/INSTALLATION

WARNING : OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN CHAPTER 24-00-00.

1. General

This topic describes the removal procedure for all secondary equipment for which removal has not been dealt with in this chapter.

For certain equipment located on the flight compartment control panels it is necessary to remove the associated electro-luminescent panel (Ref. 33-16-00).

These panels are electrically interconnected by means of removable cable links to terminals at the rear of the panels.

2. Magnetic Indicator H1011, H1012, H1013

A. Prepare

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(2) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
TEMP COMPTR IND GRP SELECT MI SUP	5-213	H 999	B 9

(3) Disconnect quick release fasteners, open TEMPERATURE CONTROL panel.

B. Remove
(Ref. Fig. 401)

(1) Remove electro-luminescent panel (Ref. 33-16-00).

(2) Remove cable ties if necessary to obtain easy access to the terminals of equipment concerned.

(3) Disconnect electrical cables from terminals. Use a suitable insertion/extraction tool on magnetic indicators equipped with pin type connectors.

(4) Loosen attachment screws (1) ; remove magnetic indicator (2) from the rear of panel.

C. Install
R (Ref. Fig. 401)
R
R (1) Install magnetic indicator (2) tighten attachment screws (1).

NOTE : Assemble magnetic indicators on panel with the word TOP adjacent to white line on rear of panel assembly.

R (2) Connect electrical cables to magnetic indicator. Use a suitable insertion/extraction tool on indicators equipped with pin type connectors. Make certain that the connections are made in conformity with electrical cable identifiers and associated wiring diagrams.

R (3) Install electro-luminescent panel (Ref. 33-16-00).

R (4) If necessary, install the cable ties.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

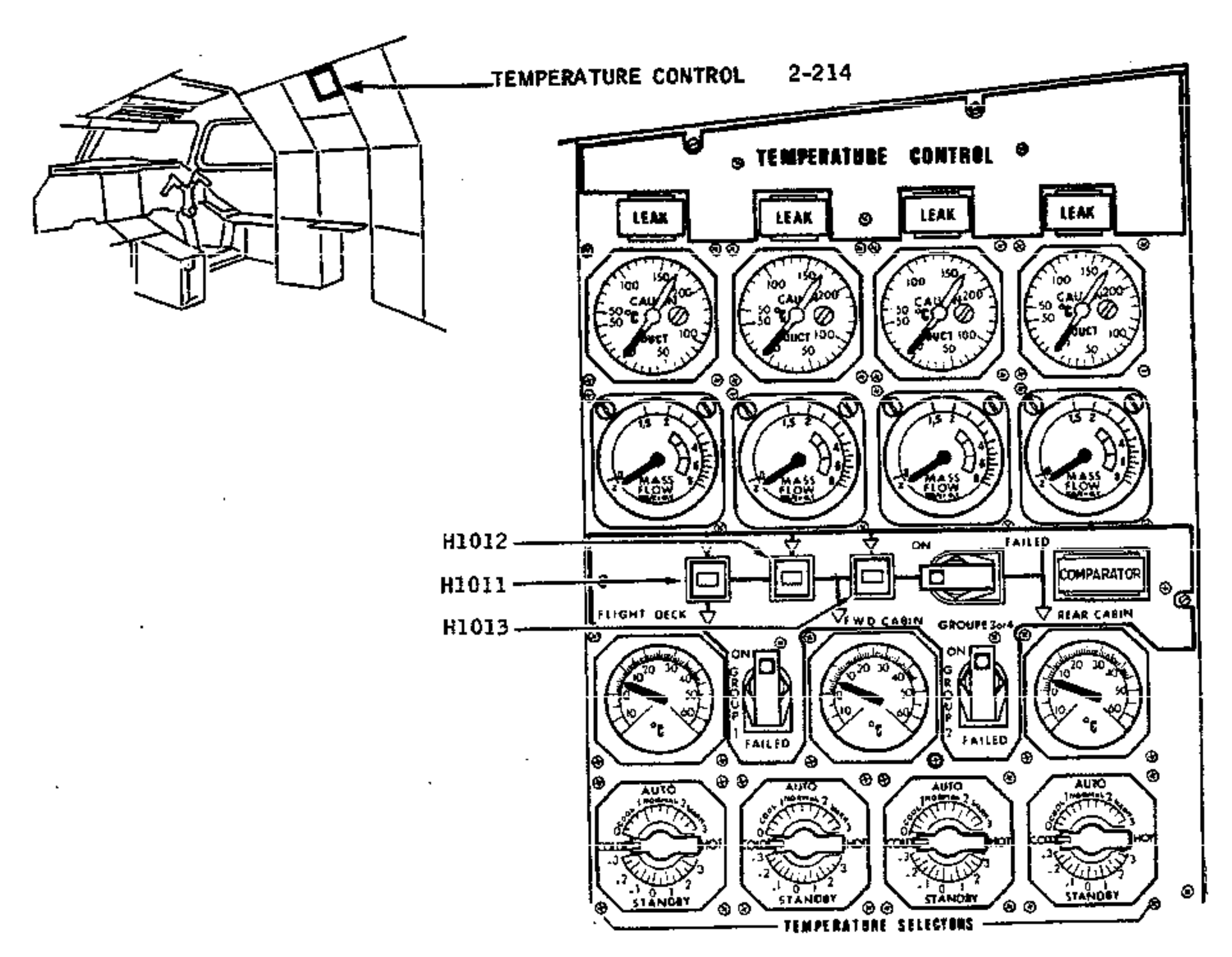
R (5) Close the panel, tighten the quick release fasteners.

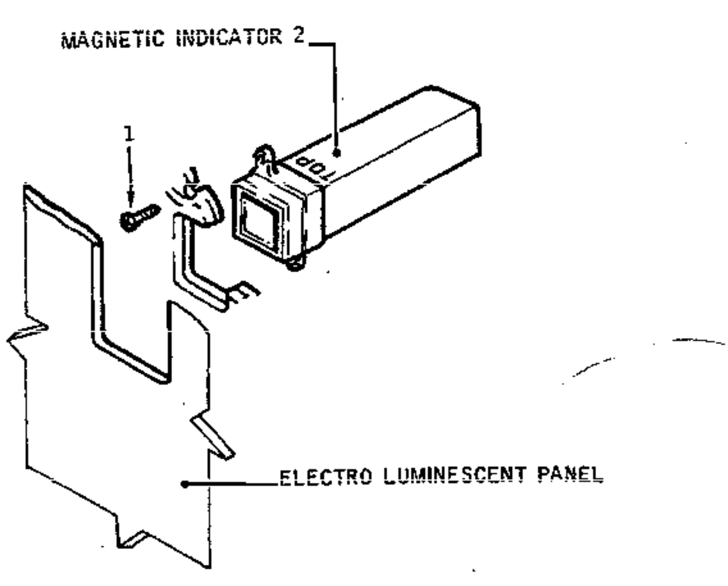
CAUTION : CHECK THAT NO CABLES ARE CAUGHT OR DAMAGED WHEN CLOSING PANEL.

D. Test

R (1) Connect electrical ground power unit and energize
R the aircraft electrical network (Ref. 24-41-00,
R Servicing).

R (2) Check magnetic indicator for correct operation by carrying out the appropriate test procedure.





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Magnetic Indicators H1011, H1012, H1013
Figure 401

R

3. Caption Light H1014

A. Prepare

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(2) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
TEMP COMPT IND GRP SELECT MI SUP	5-213	H 999	B 9

(3) Loosen quick release fasteners, open TEMPERATURE CONTROL panel.

B. Remove
(Ref. Fig. 402)

(1) If necessary, remove electrical cable ties in order to obtain easy access to terminals of equipment concerned.

(2) Disconnect cable from terminals. Use a suitable insertion/extraction tool on caption lights equipped with pin type connectors.

(3) Disengage springs (2) holding clamp in position. Remove caption light 1 module from the front of panel.

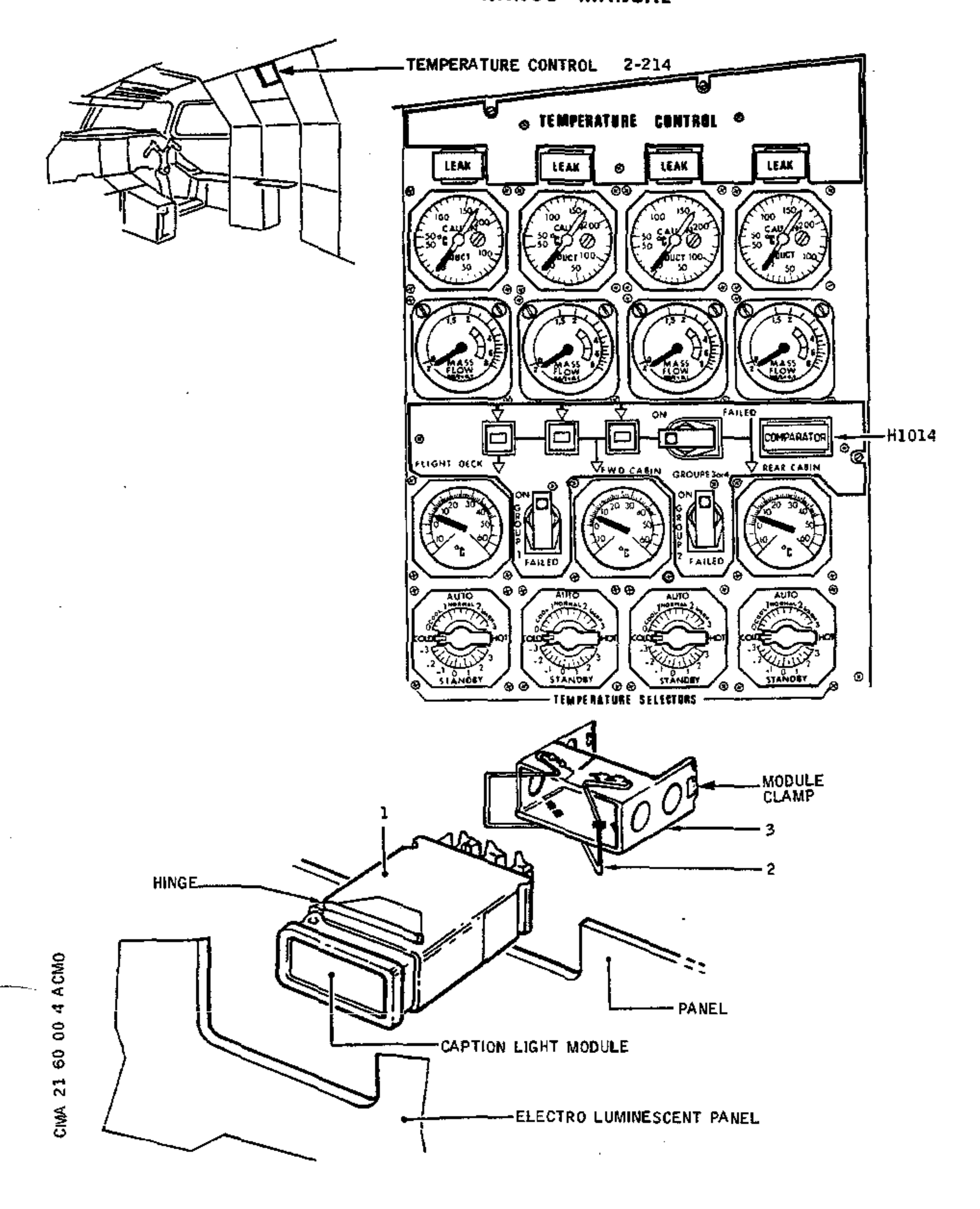
C. Install
R (Ref. Fig. 402)

NOTE : Assemble caption lights on panel with hinge adjacent to white line on rear of panel assembly.

R
R (1) Install clamp (3) at rear of panel. Insert caption light module in its housing.

R (2) Hold light module (1) against front of panel, and press home securing clamp (3) until retention springs are engaged in the grooves on light module.

R (3) Connect cable to caption light. Use a suitable insertion/extraction tool on caption lights equipped with pin type connectors. Make certain that the connections are made in conformity with electrical cable identi-



R

Caption Light H1014 Removal/Installation
Figure 402

R fiers and the associated wiring diagrams.

R (4) If necessary, install cable ties.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

R (5) Close the panel, fully tighten quick release fasteners.

CAUTION : CHECK THAT NO CABLES ARE CAUGHT OR DAMAGED WHEN CLOSING PANEL.

D. TEST

R (1) Connect electrical ground power unit and energize the
R aircraft electrical network (Ref. 24-41-00, Servicing)

R (2) Check the correct operation of caption light by carrying out the appropriate test procedure.

4. Switch H1061, H1062, H1063

A. Prepare

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(2) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
TEMP COMPTR IND GRP SELECT MI SUP	5-213	H 999	B 9

(3) Loosen quick release fasteners, open TEMPERATURE CONTROL panel.

B. Remove
(Ref. Fig. 403)

(1) If necessary, disconnect cable ties in order to obtain easy access to equipment terminals.

(2)- Disconnect cable from terminals. Use a suitable insertion/extraction tool on toggle switches fitted with pin type terminals.

(3) On front of panel, lower switch guard, loosen and remove attachment nut.

(4) Remove locking washer, switch guard and locating washer

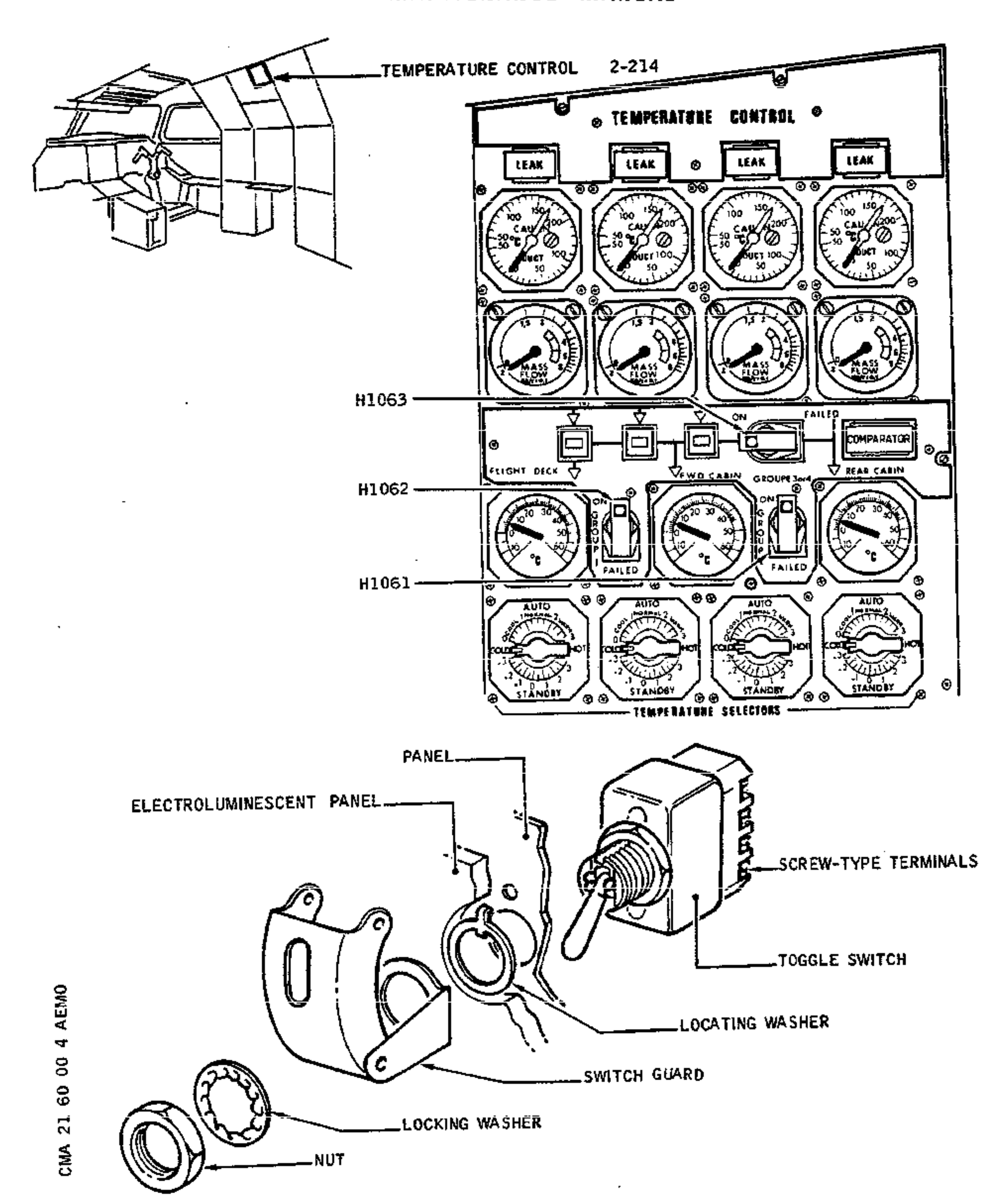
(5) Remove toggle switch.

C. Install
R (Ref. Fig. 403)
R
R (1) Install toggle switch in correct alignment with locating washer.

R (2) Position locating washer, install switch guard and locking washer.

R (3) Fully tighten attachment nut.

R (4) Connect cables to toggle switch. On switches fitted with pin type connectors use a suitable insertion/ex-



Switch H1061, H1062 Removal/Installation
Figure 403

R

traction tool. Make certain that connections are made in conformity with electrical cable identifiers and the associated wiring diagrams.

R (5) Install cable ties, if necessary.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

R (6) Close the panel, tighten quick release fasteners.

CAUTION : CHECK THAT NO CABLES ARE CAUGHT OR DAMAGED WHEN CLOSING PANEL.

D. Test

R (1) Connect electrical ground power unit and energize the
R aircraft electrical network (Ref. 24-41-00, Servicing).

R (2) Check the correct operation of the switch by carrying out the appropriate test procedure.

R 5. Diode

R A. Prepare

R (1) De-energize the aircraft electrical network and dis-
R connect electrical ground power unit (Ref. 24-41-00,
R Servicing).

R (2) Trip, safety and tag the following circuit breaker :

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R R	TEMP CONTR IND GRP SELECT MI. SUP	5-213	H 999	B 9

R (3) Open access door 2-214 at Flight Engineer's station.

R B. Remove
R (Ref. Fig. 404)

R (1) On aft face of panel 2-214, remove screws (1) ; retain
R washers.

R (2) Remove protective plate (2).

R (3) Unsolder the concerned diode.

R CAUTION : BEFORE UNSOLDERING THE DIODE, PROTECT THE
R CABLES AND EQUIPMENT TO PREVENT DAMAGE BY
R DROPS OF SOLDER.

R C. Preparation of Replacement Component

R (1) If necessary, cut diode terminal wires.

R D. Install
R (Ref. Fig. 404)

R (1) Solder diode to soldering points ; respect the pola-
R rity :

R - Diode input to terminal 1
R - Diode output to terminal 2

R CAUTION : BEFORE SOLDERING THE DIODE, PROTECT THE
R CABLES AND EQUIPMENT TO PREVENT DAMAGE BY
R DROPS OF SOLDER.

R (2) Install protective plate (2), washers and screws (1).

R E. Close-Up

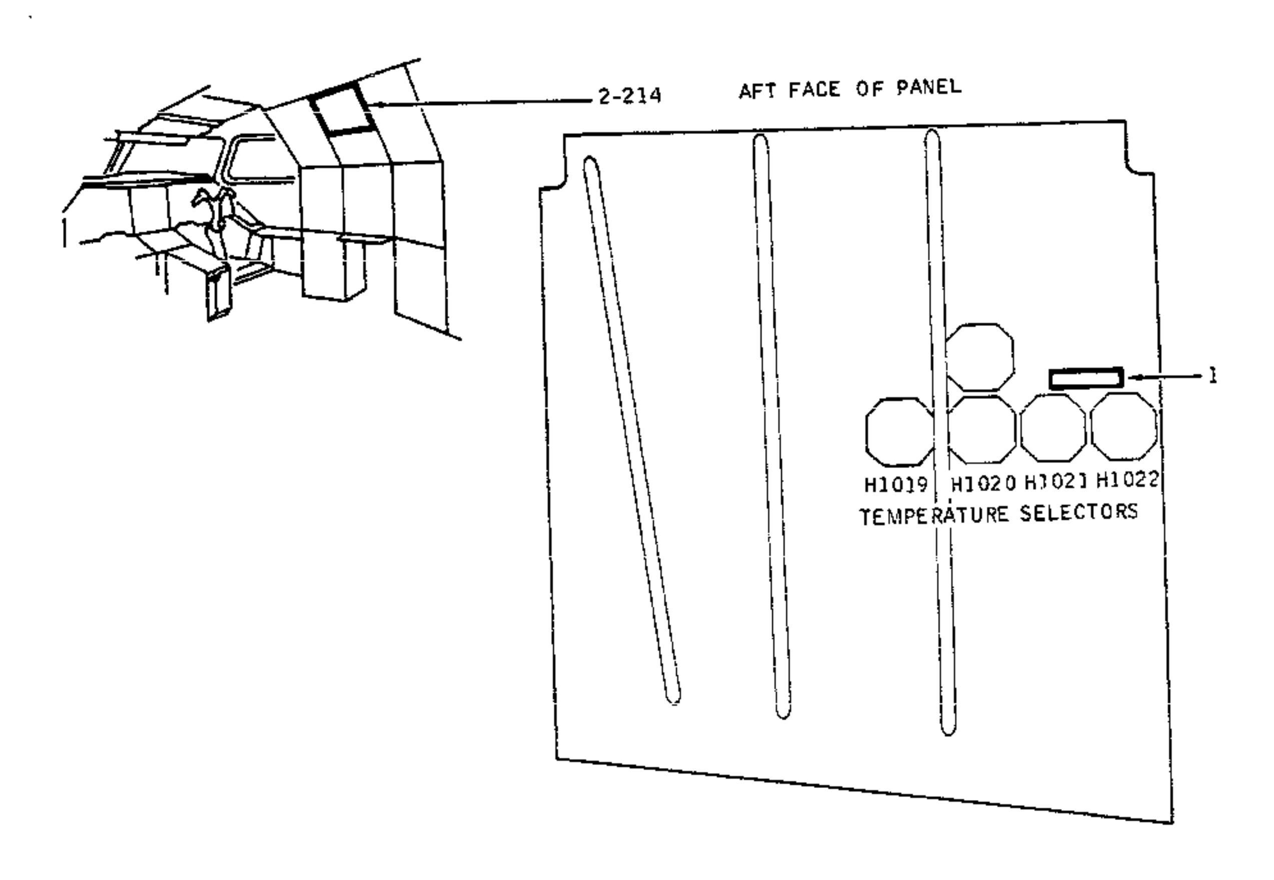
R CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR
R OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

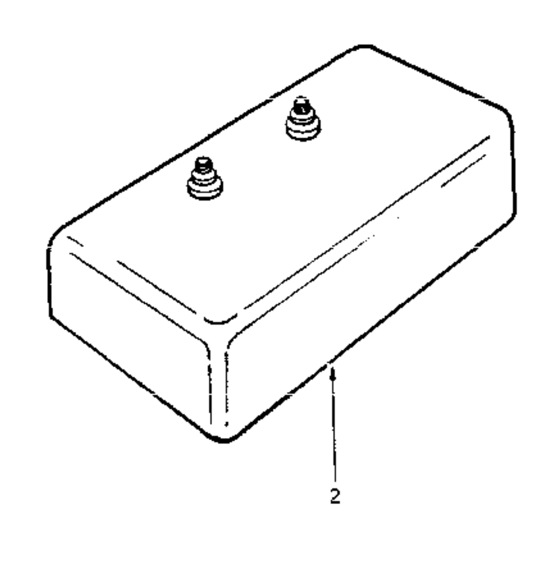
R (1) At Flight Engineer's station, close access door 2-214.

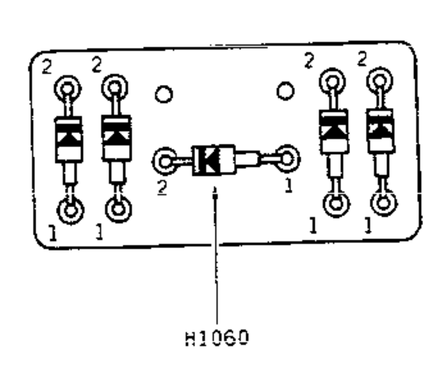
R (2) Remove safety clips and tags and reset the circuit
R breakers tripped in paragraph A (2).

R F. Test

R (1) Check that the replaced diode operates correctly
R by carrying out the corresponding test procedure.







CMA 21 60 00 4 AGMO

Diode H1060
Figure 404

R

R 6. Relays 3H903, 4H903

R A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 10.7 ft (3.20 m)	

R B. Prepare

R (1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

R (2) In zone 123, open access door 123AB.

R (3) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP3 AIR COND VALVE & AIR GEN IND	15-215	3H 612	A 3
GRP4 AIR COND VALVE & AIR GEN IND	15-216	4H 612	A24

R C. Remove
(Ref. Fig. 405)

R (1) In compartment 123, on unit 8-123, unscrew knurled nuts (1) and remove fasteners (2) from unit.

R (2) Remove wires from top of unit (2 quick release fasteners on each clamp (3)).

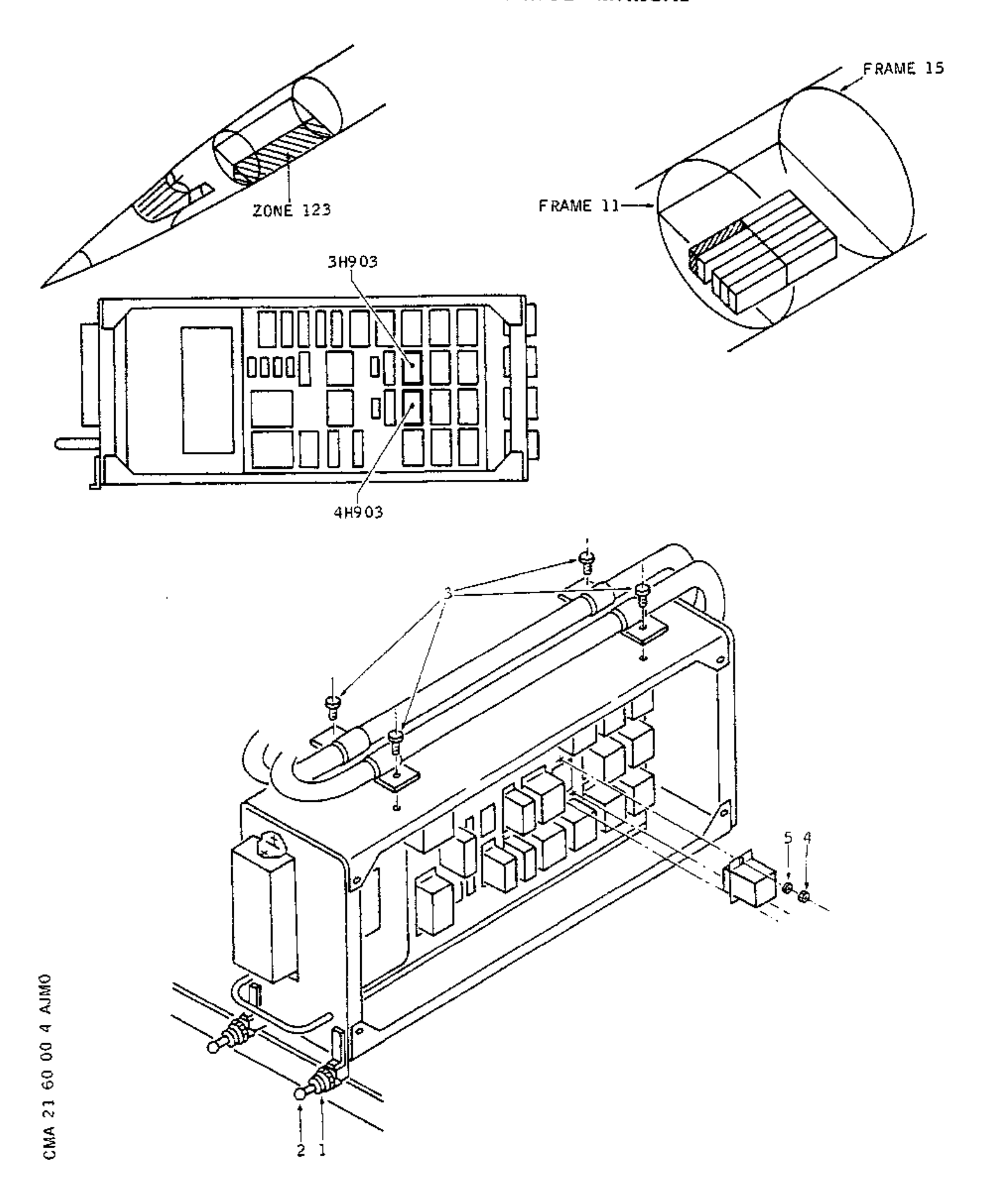
R (3) Pull unit forward in order to gain access to relay to be removed.

R (4) Remove nuts (4) from relay, retain washers (5).

R (5) Slightly pull relay to remove it.

R D. Install

R (1) Install relay on its support, install washers (5) ;



R

Relay Removal
Figure 405

R screw nuts (4).

R (2) Install cables on upper face of unit ; tighten screws
R attaching clamps (3).

R (3) Install unit in its housing ; install fasteners (2) ;
R tighten knurled nuts (1).

R G. Close-Up

R CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR
R OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

R (1) In zone 123, close access door 123AA ; remove access
R platform.

R (2) Remove safety clips and tags and reset the circuit
R breakers tripped in paragraph B (3).

R H. Test

R Check that the replaced relay operates correctly by carrying
R out the corresponding test procedure.

R TEMPERATURE CONTROL - ADJUSTMENT/TEST

R 1. General

R The purpose of this test is to check that each air conditioning
R group temperature control system operates correctly.

R 2. Test

R A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Ground Air Supply Unit - Relative minimum pressure : 2 bars airflow 0.4 Kg/s - Relative maximum pressure : 4.5 bars airflow 0.6 Kg/s Temperature must not exceed 300°C Depressurizing unit capable of simulating a pressure corresponding to 35,000 feet	
Adapter - Static Port	T8751E22783001
Circuit Breaker Safety Clips	

R B. Prepare

R (1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

R (2) Check that the circuit breakers associated with group to be tested are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 1 B/VALVE CONT & OVER PRESS IND	1-213	1H 611	D10
ENG 2 B/VALVE CONT & OVER PRESS IND	5-213	2H 611	A 8

R

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 3 B/VALVE CONT & OVER PRESS IND	15-215	3H 611	A 4
ENG 4 B/VALVE CONT & OVER PRESS IND	15-216	4H 611	A23
ENG 1 CHARGE AIR PRESS IND	13-215	1H 864	D 2
ENG 2 CHARGE AIR PRESS IND	13-216	2H 864	B20
ENG 3 CHARGE AIR PRESS IND	13-215	3H 864	F 3
ENG 4 CHARGE AIR PRESS IND	13-216	4H 864	B21
ENG 1 C/BLEED VALVE CONT	1-213	1H 861	D12
ENG 2 C/BLEED VALVE CONT	5-213	2H 861	F 8
ENG 3 C/BLEED VALVE CONT	15-215	3H 861	B 4
ENG 4 C/BLEED VALVE CONT	15-216	4H 861	B24
GRP 1 AIR COND VALVE CLOSE & AIR GEN IND	1-213	1H 612	D11
GRP 2 AIR COND VALVE CLOSE & AIR GEN IND	5-213	2H 612	A 9
GRP 3 AIR COND VALVE CLOSE & AIR GEN IND	15-215	3H 612	A 3
GRP 4 AIR COND VALVE CLOSE & AIR GEN IND	15-216	4H 612	A24
GRP 1 AIR GEN CONT & IND	1-213	1H 862	D13
GRP 2 AIR GEN CONT	5-213	2H 862	F 9

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
& IND			
GRP 3 AIR GEN CONT & IND	15-215	3H 862	B 3
GRP 4 AIR GEN CONT & IND	15-216	4H 862	B23
GRP 1 FUEL VALVE CONT	2-213	1H 863	D16
GRP 2 FUEL VALVE CONT	4-213	2H 863	E12
GRP 3 FUEL VALVE CONT	2-213	3H 863	F16
GRP 4 FUEL VALVE CONT	4-213	4H 863	B11
GRP 1 AIR COND VALVE EMER CLOSE SUP	1-213	1H 667	F13
GRP 2 AIR COND VALVE EMER CLOSE SUP	5-213	2H 667	A10
GRP 3 AIR COND VALVE EMER CLOSE SUP	15-215	3H 667	F 2
GRP 4 AIR COND VALVE EMER CLOSE SUP	15-216	4H 667	F26
GRP 1 CAU/DUCT TEMP IND	1-213	1D 162	E11
GRP 2 CAU/DUCT TEMP IND	5-213	2D 162	D 9
GRP 3 CAU/DUCT TEMP IND	15-215	3D 162	C 4
GRP 4 CAU/DUCT TEMP IND	15-216	4D 162	C23
TEMP COMPTR IND & GRP SELECT M1 SUP	5-213	H 999	B 9
GRP 3 BUS NORM SUP	15-215	H1900	G 3
GRP 3 BUS STBY SUP	1-213	H1901	F12
GRP 4 BUS NORM SUP	15-216	H1902	F23
GRP 4 BUS STBY SUP	5-213	H1903	B10

R

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R	GRPS 3 & 4 COMPTR CONT	4-213	H1006	C11
R	FLT DECK TEMP IND	1-213	1D 161	E10
R	FWD CABIN TEMP IND	5-213	2D 161	D 8
R	REAR CABIN TEMP IND	15-215	3D 161	C 3
R R	GRP 1 TEMP SELECTOR AUTO SUP & CONT	2-213	H1000	B17
R R	GRP 2 TEMP SELECTOR AUTO SUP & CONT	4-213	H1001	E11
R R	GRP 3 TEMP SELECTOR AUTO SUP & CONT	2-213	H1002	G16
R R	GRP 4 TEMP SELECTOR AUTO SUP & CONT	4-213	H1003	B12
R R	GRP 1 TEMP SELECTOR MANL SUP & CONT	1-213	H 991	F11
R R	GRP 2 TEMP SELECTOR MANL SUP & CONT	5-213	H 992	B 8
R R	GRP 3 TEMP SELECTOR MANL SUP & CONT	15-215	H 993	D 3
R R	GRP 4 TEMP SELECTOR MANL SUP & CONT	15-216	H 994	C24
R R	GRP 1 SAMPLING DUCT FAN SUP	2-213	H1004	B16
R R	GRP 2 SAMPLING DUCT FAN SUP	4-213	H1005	D12
R R	GRP 1 TEMP VALVE POSN IND	13-215	H1007	E 1
R R	GRP 2 TEMP VALVE POSN IND		H1008	E 2
R R	GRP 3 TEMP VALVE POSN IND	13-216	H1009	C19
R	GRP 4 TEMP VALVE		H1010	D19

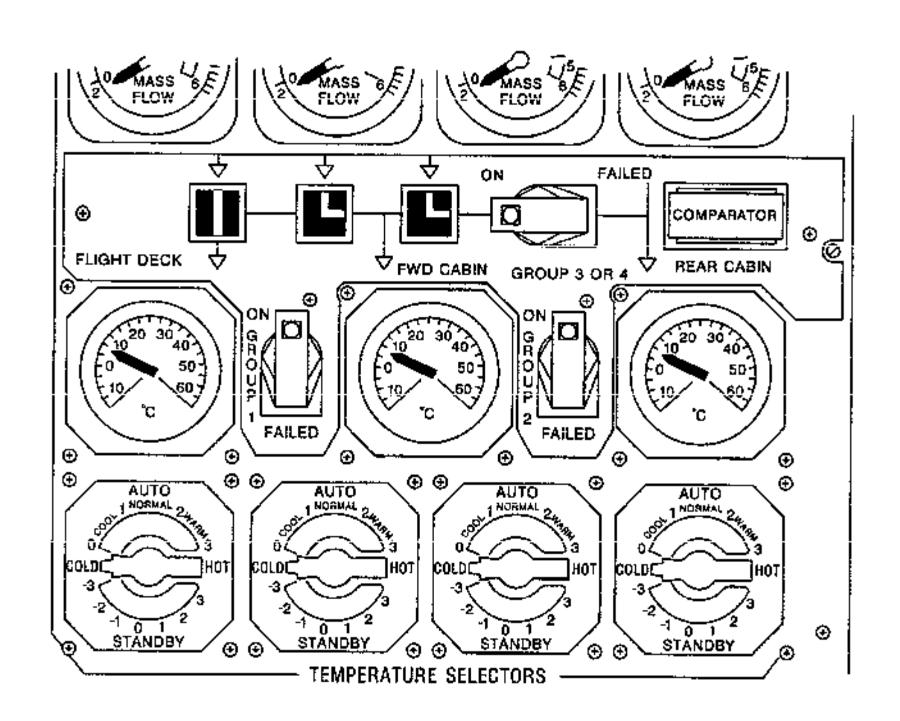
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R

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
POSN IND			
GRP 1 ICE DETECTOR SENSOR SUP	15-215	H 995	D 4
GRP 2 ICE DETECTOR SENSOR SUP	15-216	H 996	D24
GRP 3 ICE DETECTOR SENSOR SUP	15-215	H 997	E 4
GRP 4 ICE DETECTOR SENSOR SUP	15-216	H 998	E23

(3) On TEMPERATURE CONTROL panel 2-214, place the four temperature control selectors in AUTO NORMAL position. Check that GROUP 1, GROUP 2, GROUP 3 or 4 switches are in ON position.

(4) On TEMPERATURE CONTROL panel 2-214, check that magnetic indicators are in the position shown on the following figure (Ref. Fig. 501)



Panel 2-214 - Magnetic Indicators
Figure 501

(5) On panel 6-214, place LIGHTS CTR switch in TEST position and check that all warning lights come on on AIR BLEED CONTROL and TEMPERATURE CONTROL panels.

(6) Release LIGHTS CTR switch and check that all warning lights go off on AIR BLEED CONTROL and TEMPERATURE CONTROL panels.

(7) Check that the fire control handle is in NORMAL position.

(8) On panel 2-214, place CROSS BLEED switch in SHUT position.

(9) Check that:

- COND VALVE switch is in OFF position
- The refueling-defueling valves are shut
- HYD/COND/FUEL, EXCH, BY-PASS switches are in ARMED position

- The fuel control valve opens and closes correctly with a time delay ; check this on FUEL VALVE magnetic indicator by operating FUEL VALVE switch. Return switch to AUTO position.

R (10) It is necessary for an observer to be in position under
R the nacelle, connected by telephone to the flight compartment.

(11) Trip, safety and tag the air starter valves circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 1 & 4 AIR START CONT	15-215	K 181	C15
ENG 2 & 3 AIR START CONT	15-216	K 182	D11

CAUTION : BEFORE STARTING THE TEST, MAKE CERTAIN THE AIR STARTER VALVES IN THE ENGINE ZONE ARE CLOSED BY CHECKING THE POINTER, THE MANUAL CONTROL OF WHICH MUST BE IN THE HORIZONTAL "SHUT" POSITION.

R CHECK BOOTSTRAP FOR FULL OIL LEVEL.
CHECK THAT DUAL PRESSURE REDUCING SHUT-OFF VALVES, AIR CONDITIONING VALVES, FUEL CONTROL VALVES AND PRIMARY HEAT EXCHANGER RAM AIR CONTROL VALVES ARE NOT MANUALLY SHUT.

(12) On FUEL MANAGEMENT panel 5-214, pressurize fuel system associated with corresponding engine.
The feed tank level indicator must indicate that there is a minimum quantity of fuel of 1500 Kg in the appropriate feed tank.
Two, out of the three ENGINE FEED PUMP switches associated with each feed tank, must be in ON position.
The corresponding LOW PRESS caption light comes on then goes off within three seconds.

(13) Connect and start up ground air supply unit.

(14) On AIR BLEED CONTROL panel 2-214, place the corresponding CROSS BLEED switch in OPEN position.
Magnetic indicator displays an in-line indication.
Pressure value increases on pressure indicator of corresponding group.

(15) On AIR BLEED CONTROL panel 2-214, place COND VALVE switch in ON position.
COND VALVE magnetic indicator shows an in-line indication.
On TEMPERATURE CONTROL panel 2-214, MASS FLOW indicator indicates an airflow value.

C. Test of GROUP 1 Temperature Control

(1) STANDBY Temperature Control Test

(a) On TEMPERATURE CONTROL panel 2-214, place temperature control selector in STANDBY-3 position R

- On AIR BLEED CONTROL panel 2-214, check that the corresponding temperature control valve position indicator pointer moves towards C.

- On TEMPERATURE CONTROL panel 2-214, check that the temperature decreases on corresponding DUCT indicator

(b) Place temperature control selector in STANDBY 6 position

- Check that temperature control valve position indicator pointer moves towards H.
- Check that temperature increases on corresponponding DUCT indicator

(c) Place temperature control selector in AUTO - NORMAL position.

(2) Test of Automatic Temperature Control

(a) On TEMPERATURE CONTROL panel 2-214, place GROUP 1 temperature control selector in AUTO - COOL position.

- On AIR BLEED CONTROL panel 2-214, check that GROUP 1 temperature control valve position indicator pointer moves towards C.
- On TEMPERATURE CONTROL panel 2-214, check that temperature value decreases on DUCT 1 indicator.

(b) Place GROUP 1 temperature control selector in AUTO - WARM position

- Check that GROUP 1 temperature control valve position indicator moves towards H

- Check that temperature value increases on DUCT No.1 indicator

(c) Place GROUP 1 temperature control selector in AUTO - NORMAL position.

D. Changeover Test : Cancellation of Low Temperature Limitation

NOTE : As the test is identical for the four air conditioning groups, operate the instruments bearing the number of the group concerned.

(1) Check that both PRESS STATIC HEATER switches on Captain's upper panel are in OFF position.

(2) On FUEL MANAGEMENT panel 5-214, check that the temperature of fuel in feed tank associated with the relevant group does not exceed 35°C.

(3) On TEMPERATURE CONTROL panel 2-214, place temperature control selector in AUTO COOL position

- On AIR BLEED CONTROL panel, check that temperature control valve position indicator pointer moves towards C.
- On TEMPERATURE CONTROL panel 2-214, check, on relevant DUCT indicator that temperature stabilizes at 5°C approximately

(4) Connect depressurizing unit to static port
S11 group 1
S13 group 2
S08 group 3
S10 group 4
using adapter T8751E22783002.

(5) Using depressurizing unit gradually decrease the pressure until it corresponds to an altitude of 30,000 - 1000 + 300 feet

- The temperature value read on DUCT indicator decreases again down to - 15°C

NOTE : If the air has a high relative humidity, the temperature control valve position indicator
R pointer may not stay on the C position (cold). If the ice sensor transducer detects ice in the conditioning air it transmits a "hot" control signal to the temperature control valve.

R (6) Gradually increase pressure on the depressurizing

R unit to decrease simulated altitude ; check that DUCT indicator pointer returns to + 5°C and stabilizes at this value for altitudes less than 30,000 feet.

(7) Place temperature control selector in AUTO - NORMAL position.

(8) Disconnect depressurizing unit, remove adapter.

F. Test of Group 2 Temperature Control

(1) Standby Temperature Control Test

The tests are identical to those described in paragraph 2 C (1)

(2) Test of Group 2 Automatic Temperature Control

(a) Place a shunt between terminal H of comparison unit H1027 test connector and aircraft ground.

(3) On TEMPERATURE CONTROL panel 2-214, place temperature control selector in AUTO - COOL position.

- On AIR BLEED CONTROL panel 2-214, check that pointer of temperature control valve position indicator No.2 moves towards C
- On TEMPERATURE CONTROL panel 2-214, check that temperature decreases on DUCT 2 indicator

(4) Place temperature control selector No.2 in AUTO - WARM position

- Check that pointer of temperature control valve position indicator No.2 moves towards H.
- On TEMPERATURE CONTROL panel 2-214, check that temperature increases on DUCT 2 indicator

(5) Place temperature control selector No.2 in AUTO - NORMAL position.

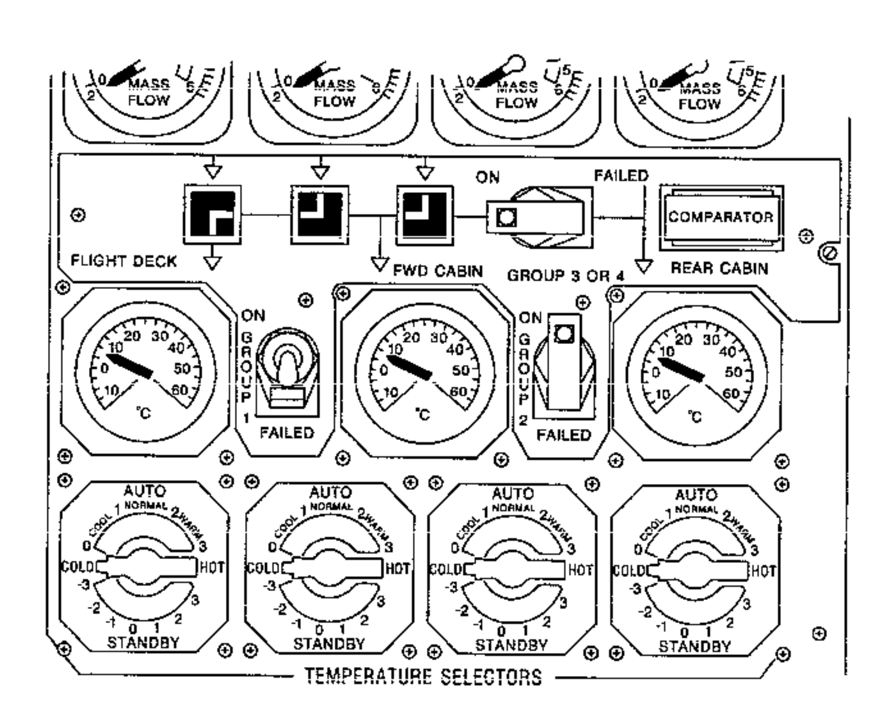
(6) Remove the shunt located between terminal H of comparison unit test connector and aircraft ground.

G. Changeover Test : Cancellation of Low Temperature Limitation (Altitude > 30,000 - 1000 + 300 feet)

Ref paragraph 2D

H. Test of Group 2 Automatic Temperature Control with Group 1 Failed (Ref. Fig.502 and 503)

(1) On TEMPERATURE CONTROL panel 2-214, place GROUP 1 switch in FAILED position.
Check that magnetic indicators are in the position shown on the following figure:



CMB 21 60 00 5 ACM0 00

Panel 2-214 - Magnetic Indicators
Figure 502

(2) Install a shunt between terminal G of comparison unit H1027 test connector and aircraft ground.

(3) On TEMPERATURE CONTROL panel 2-214, place temperature control selector No.2 in AUTO - COOL position.

- On AIR BLEED CONTROL panel 2-214, check that pointer of temperature control valve position indicator No.2 moves towards C.
  On TEMPERATURE CONTROL panel 2-214, check that temperature decreases on DUCT 2 indicator

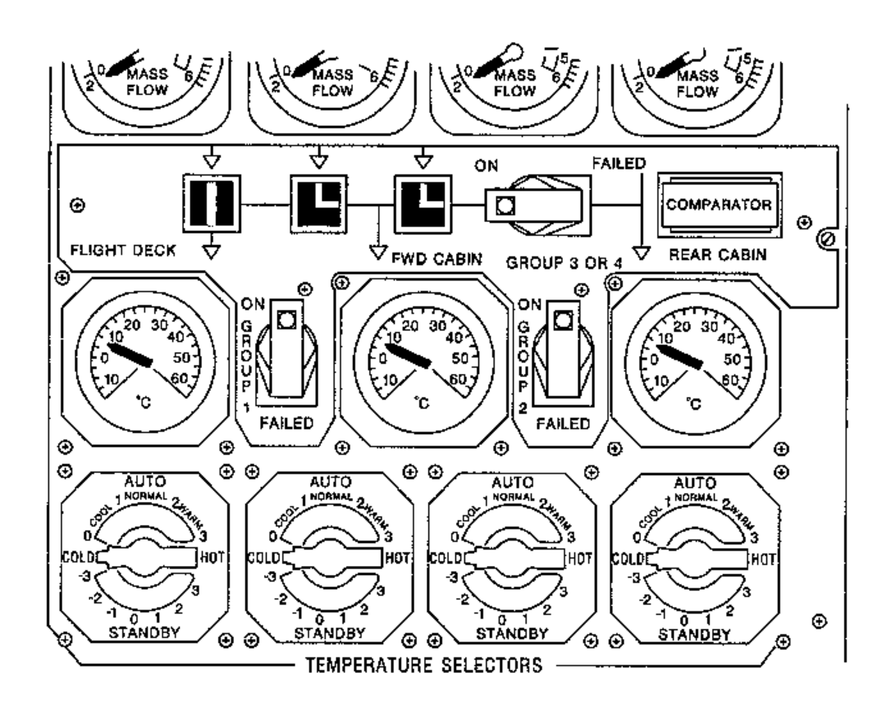
(4) Place temperature control selector No.2 in AUTO - WARM position.

- Check that pointer of temperature control valve position indicator No.2 moves towards H.
- On TEMPERATURE CONTROL panel 2-214, check that temperature increases on DUCT 2 indicator.

(5) Place temperature control selector No.2 in AUTO - NORMAL position.

(6) Remove the shunt located between terminal G of comparison unit test connector and aircraft ground.

(7) On TEMPERATURE CONTROL panel 2-214, place GROUP 1 switch in ON position.
Check that magnetic indicators are in the position shown on the following figure:



Panel 2-214 - Magnetic Indicators
Figure 503

J. Test of Group 3 Temperature Control

(1) Test of STANDBY Temperature Control

The test procedures are identical to those described

in paragraph 2 C (1).

(2) Test of Group 3 Automatic Temperature Control

(a) Install a shunt between terminal G of comparison unit H1027 and aircraft ground.

(b) On TEMPERATURE CONTROL panel 2-214, place temperature control selector No.3 in AUTO - COOL position.

- On AIR BLEED CONTROL panel 2-214, check that pointer of temperature control valve position indicator No.3 moves towards C.
On TEMPERATURE CONTROL panel 2-214, check that temperature decreases on DUCT 3 indicator

(c) Place temperature control selector No.3 in AUTO - WARM position

- Check that pointer of temperature control valve position indicator No.3 moves towards H
- On TEMPERATURE CONTROL panel 2-214, check that temperature increases on DUCT 3 indicator

(d) Place temperature control selector No. 3 in AUTO - NORMAL position.

(e) Remove the shunt located between terminal G of comparison unit test connector and aircraft ground

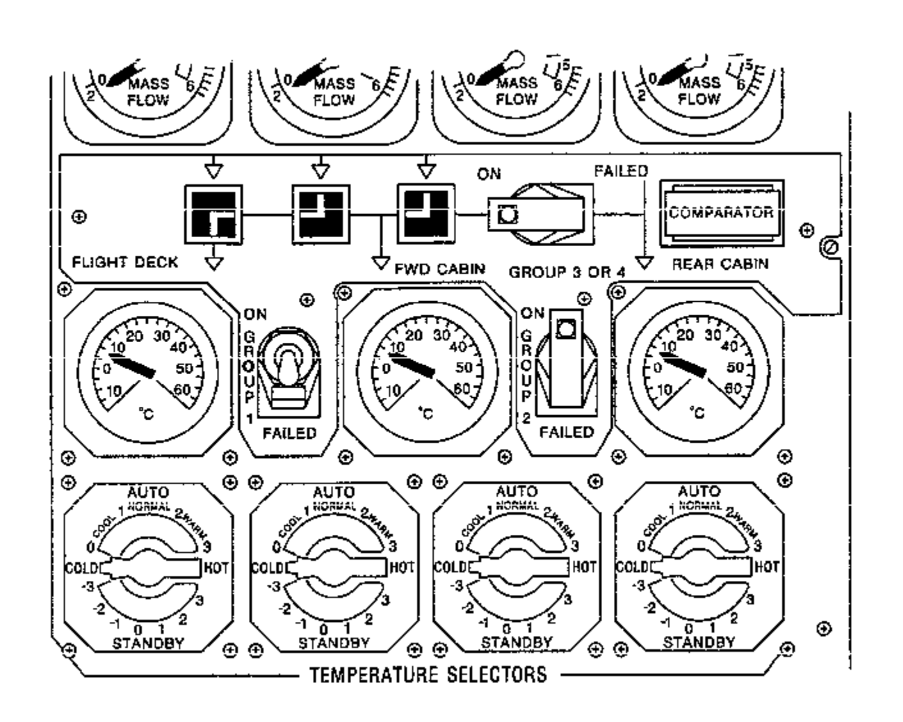
K. Changeover Test : Cancellation of Low Temperature Limitation (Altitude > 30,000 - 1000 + 300 feet)

R The test procedures are identical to those described in
R paragraph 2 D.

L. Test of Group 3 Automatic Temperature Control with Group 1 Failed (Ref. Fig.504 and 505)

(1) On TEMPERATURE CONTROL panel 2-214, place GROUP 1 switch in FAILED position

- Check that magnetic indicators are in the position shown on the following figure



CMB 21 60 00 5 AGM0 00

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Panel 2-214 - Magnetic Indicators
Figure 504

(2) Install a shunt between terminal Z of comparison unit H1027 and aircraft ground.

(3) On TEMPERATURE CONTROL panel 2-214, place temperature control selector No.3 in AUTO - COOL position.

- On AIR BLEED CONTROL panel 2-214, check that pointer of temperature control valve position indicator No.3 moves towards C.
  On TEMPERATURE CONTROL panel 2-214, check that temperature decreases on DUCT 3 indicator.

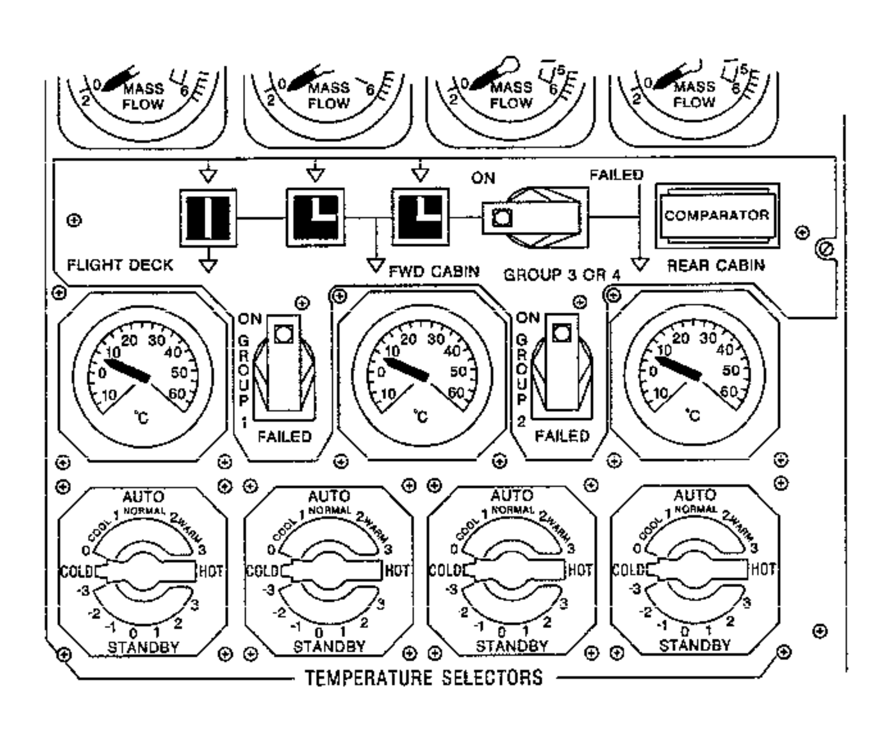
(4) Place temperature control selector No.3 in AUTO - WARM position

- Check that pointer of temperature control valve position indicator No.3 moves towards H.
- On TEMPERATURE CONTROL panel 2-214, check that temperature increases on DUCT 3 indicator

(5) Place temperature control selector No.3 in AUTO - NORMAL position.

(6) Remove the shunt located between terminal of comparison unit test connector and aircraft ground.

(7) Place GROUP 1 in "ON" position.
Check that magnetic indicators are in the position shown on the following figure:



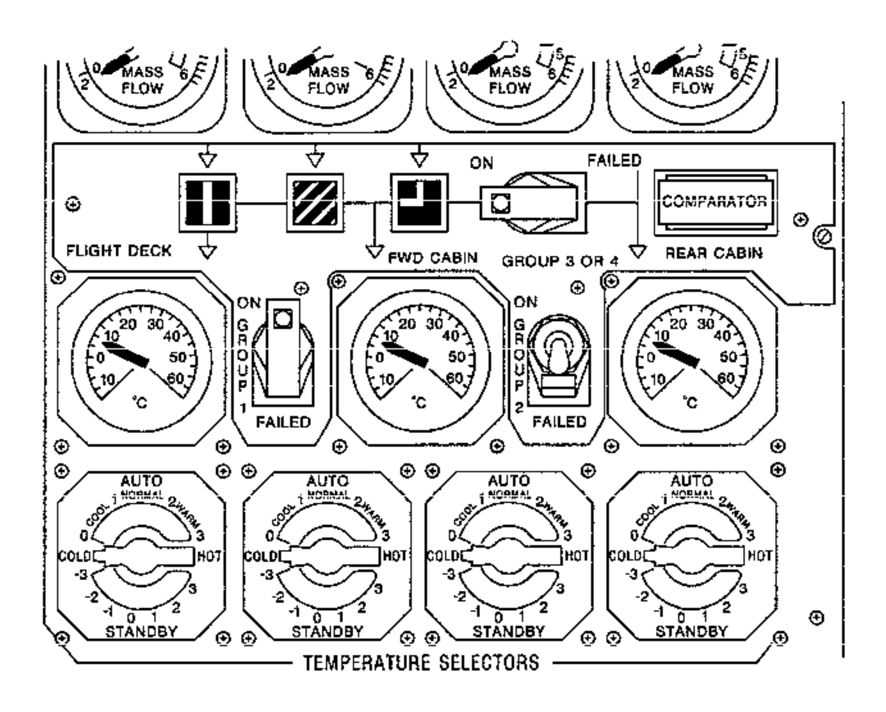
CMB 21 60 00 5 AJM0 00

Panel 2-214 - Magnetic Indicators
Figure 505

M. Test of Group 3 Automatic Temperature Control with Group 2 Failed (Ref. Fig.506 and 507)

(1) On TEMPERATURE CONTROL panel 2-214, place GROUP 2 switch in FAILED position.

- Check that magnetic indicators are in the position shown on the following figure



Panel 2-214 - Magnetic Indicators
Figure 506

(2) Install a shunt between terminal Z of comparison Unit H1027 test connector and aircraft ground.

(3) On TEMPERATURE CONTROL panel 2-214, place temperature control selector No.3 in AUTO - COOL position.

- On AIR BLEED CONTROL panel 2-214, check that pointer of temperature control valve position indicator No.3 moves towards C.
  On TEMPERATURE CONTROL panel 2-214, check that temperature decreases on DUCT 3 indicator.

(4) Place temperature control selector No.3 in AUTO - WARM position

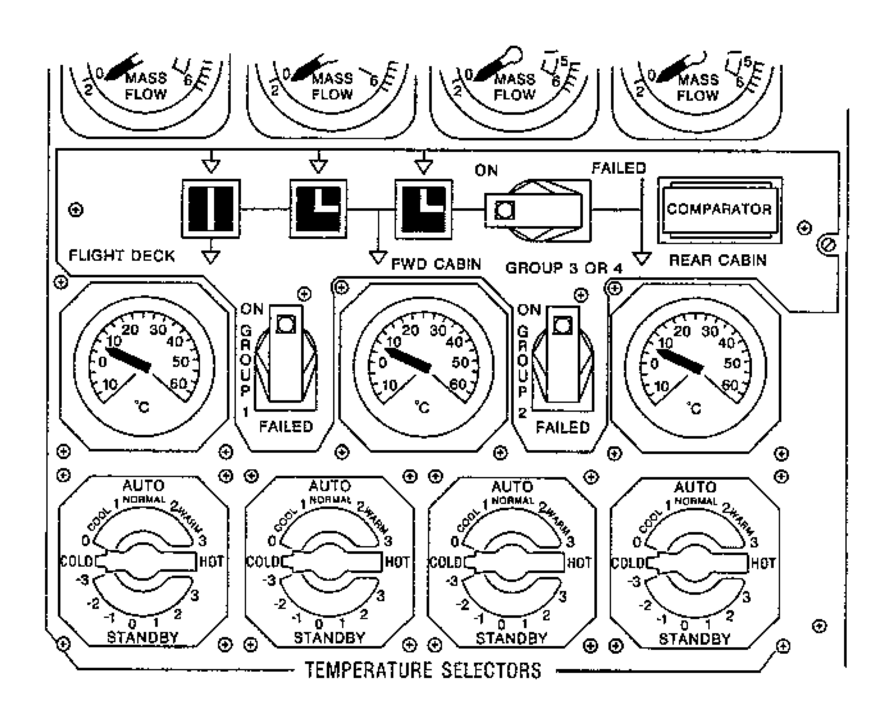
- Check that pointer of temperature control valve position indicator No.3 moves towards H.
- On TEMPERATURE CONTROL panel 2-214, check that temperature increases on DUCT 3 indicator

(5) Place temperature control selector No.3 in AUTO - NORMAL position.

(6) Remove the shunt located between terminal of comparison unit test connector and aircraft ground.

(7) Place GROUP 2 switch in ON position.
Check that magnetic indicators are in the position shown on the following figure.

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CMB 21 60 00 5 ANM0 00

Panel 2-214 - Magnetic Indicators
Figure 507

N. Test of Group 4 Temperature Control

(1) Test of STANDBY temperature control.
The test procedures are identical to those described in paras. 2.C(1).

(2) Test of Automatic Temperature Control

The test procedures are identical to those described in paras. 2.C(2).

P. Changeover Test : Cancellation of Low Temperature Limitation (Altitude > 30,000 - 1000 + 300 feet)

R The test procedures are identical to those described in
R paragraph 2 D.

Q. Test of Group 3 and 4 Temperature Control (Groups 3 and 4 Slaved)

(1) On TEMPERATURE CONTROL panel 2-214, place temperature control selector No.4 in AUTO - COOL position.

- On AIR BLEED CONTROL panel 2-214, check that pointer of temperature control valve position indicator No. 3 and 4 moves towards C.
  On TEMPERATURE CONTROL panel 2-214, check that temperature decreases on DUCT 3 and 4 indicator

(2) Place temperature control selector No.4 in AUTO - WARM position.

- Check that pointer of temperature control valve position indicator No. 3 and 4 moves towards H
- On TEMPERATURE CONTROL panel 2-214, check that temperature increases on DUCT 3 and 4 indicator

(3) Place temperature control selector No.4 in AUTO - NORMAL position.

R. Test of Group 3 and 4 Temperature Control

Triggering of COMPARATOR warning

(1) Carry out the test procedure described in paragraph 2 Q.

(2) Install a shunt between terminals L and R of comparison unit H1027 test connector.

(3) On AIR BLEED control panel 2-214, check that group 3 temperature control valve position indicator pointer positions in H and that group 4 indicator pointer positions in C.

(4) On TEMPERATURE CONTROL panel 2-214, check that COMPARATOR warning light comes on.

<u>NOTE</u> : If group 3 DUCT caption light comes on, the comparator is no longer supplied since group 3 is cut out automatically. COMPARATOR warning

light goes off and group 3 temperature control valve position indicator pointer returns to normal. Group 4 indicator pointer remains in C.

(5) Place Group 3 or 4 switch in FAILED position

Check that COMPARATOR warning light goes off.

(6) On AIR BLEED CONTROL panel
- Check that group 3 temperature control valve posi-
R tion indicator pointer returns to normal position and that group 4 indicator pointer remains in C.

(7) Remove the shunt between terminals L and R of comparison unit H1027 test connector.

S. Close-Up

(1) On AIR BLEED control panel 2-214, place COND VALVE switch in OFF position

- COND VALVE magnetic indicator displays discontinuity
- MASS FLOW indicator indicates 0 (zero).

(2) Place CROSS BLEED switch in SHUT position

- CROSS BLEED magnetic indicator displays discontinuity
- Pressure value drops on pressure indicator

(3) Shut down ground air supply unit

(4) Check that :

R - FUEL VALVE switch is in AUTO position on AIR BLEED CONTROL panel
- GROUP 1, GROUP 2, GROUP 3 or 4 are in ON position on TEMPERATURE CONTROL panel
- Temperature control selectors are in AUTO - NORMAL position.

(5) Remove safety clips and tags and reset the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 1 & 4 AIR START CONT	15-215	K 181	C15

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 2 & 4 AIR START CONT	15-216	K 182	P11

(6) Restore fuel system to initial configuration.

(7) De-energize the aircraft electrical network and disconnect electrical ground power unit.

3. Test of Temperature Control System with Test Set TE6053

A. General

The following instructions are provided as a guide to the use of temperature control system test set TE6053.
It has been assumed throughout this description that persons carrying out these tests will have a basic knowledge of the aircraft air conditioning system and will therefore know the lay out of the Flight Engineer's Panel.

All four tests are written in general terms and will apply to all items in the four air conditioning groups unless otherwise stated.

Once the general instructions of paragraphs 3.C.(3) through 3.C.(7) have been completed any of the tests may be carried out singly or in any sequence such as :

- Test of master temperature controller
- Test of temperature controller
- Test of semi-automatic temperature control system.

This process enables check of all items of equipment and control units of operating system.
On completion of test, make certain that all items of equipment connected for test purposes have been removed and that all system components are correctly connected.

The switch positions are described by the identifying letter and its position number (e.g.G3 means selector G in position 3).
On test set "SIMS" simulate the resistance in volts. The equivalent resistance is given.

B. Prepare

(1) Connect electrical ground power unit and energize the

aircraft electrical network (Ref. 24-41-00, Servicing).

(2) Set the following circuit breakers associates with the group to be tested.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1			
BLEED VALVE CONTROL	1-213	1H 611	D10
AIR CONDITIONING VALVE CONTROL		1H 612	D11
CROSS-BLEED VALVE CONTROL AND IND		1H 861	D12
JET PUMP AND FLOW LIMIT VALVE CONTROL AND INDIC		1H 862	D13
TEMP SELECTOR GROUP 1, STANDBY		H 991	F11
TEMP CONTROL SELECTOR GROUP 1 AUTO	2-213	H1000	B17
SAMPLING DUCT FAN GROUP 1		H1004	B16
FUEL VALVE CONTROL GROUP 1		1H 863	D16
ICE DETECTOR SENSOR GROUP 1		H 995	D 4
Group 2			
TEMP CONTROL SELECTOR GROUP 2 AUTO	4-213	H1001	E11
SAMPLING DUCT FAN GROUP 2		H1005	D12
FUEL VALVE CONTROL GROUP 2		2H 863	E12
BLEED VALVE CONTROL	5-213	2H 611	A 8
AIR CONDITIONING VALVE CONTROL		2H 612	A 9
CROSS-BLEED VALVE CONTROL AND INDIC		2H 681	F 8
JET PUMP AND FLOW LIMIT VALVE CONTROL AND IND.		2H 682	F 9
TEMP SELECTOR GROUP 2, STANDBY		H 992	B 8
ICE DETECTOR SENSOR GROUP 2	15-216	H 996	D24
Group 3			
TEMP CONTROL SELECTOR GROUP 3 AUTO	2-213	H1002	G16

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R	FUEL VALVE CONTROL GROUP 3		3H 863	F16
R	BLEED VALVE CONTROL	15-215	3H 611	A 4
R	AIR CONDITIONING VALVE		3H 612	A 3
R	CONTROL			
R	CROSS-BLEED VALVE CONTROL		3H 861	B 4
R	AND IND			
R	JET PUMP AND FLOW LIMIT		3H 682	B 3
R	VALVE CONTROL AND INDIC			
R	TEMP SELECTOR GROUP 3,		H 993	D 3
R	STANDBY			
R	ICE DETECTOR SENSOR GROUP 3		H 997	E 4
R	GRP3 BUS NORM SUPPLY		H1900	G 3
R	Group 4			
R	TEMP CONTROL SELECTOR	4-213	H1003	B12
R	GROUP 4 AUTO			
R	FUEL VALVE CONTROL GROUP 4		4H 863	B11
R	BLEED VALVE CONTROL	15-216	4H 611	A23
R	AIR CONDITIONING VALVE		4H 612	A24
R	CONTROL			
R	CROSS-BLEED VALVE CONTROL		4H 861	B24
R	AND INDIC			
R	JET PUMP AND FLOW LIMIT VALVE		4H 862	B23
R	CONTROL AND INDIC			
R	TEMP SELECTOR GROUP 4,		H 994	C24
R	STANDBY			
R	ICE DETECTOR SENSOR GROUP 4		H 998	E23
R	GRP 4 BUS NORM SUPPLY		H1902	F23
R	COMPARATOR UNIT			
R	MAG. INDIC. SUPPLY	5-213	H 999	B 9
R	115V SUPPLY	4-213	H1006	C12

R C. Test Set Check

R (1) On unit 8-213 connect to ground pins B and D of test
R connector 5UT1890 (necessary for comparison unit test
R only).

R (2) On panel 2-214, make certain that :

R - The four COND VALVE switches 1(2, 3, 4)H866 are in OFF position
R - The four temperature control selectors are in 0 position
R - The four FUEL VALVE switches 1(2, 3, 4)H867 are in AUTO position.

R (3) Test set check

R The test set is connected to the equipment to be checked. K switch position is as follows :
R - K1 for temperature controller
R - K2 for comparison unit
R - K3 for master temperature controller
R - K4 for semi-automatic temperature selector.

R (4) Place L switch on position 2 and set simulators 1, 2, 3 and 4 to 500 DVM should read 0 ± 0.02 volt.

R (5) Adjust simulator 4 so that DVM reads 0.5 volt ; simulator 4 shall then read 684 ± 10.

R (6) Adjust simulator 2 so that DVM reads 0 ± 0.2 volt ; simulator 2 shall then read the same as simulator 4 above within a tolerance of ± 5.

R (7) If the test set metts these requirements, it is in correct operating condition.

R D. Test of Master Temperature Controller 1(2, 3, 4)H868

R System test of airflow indicator, fuel throttle valve, water separator valve.

R (1) Connect test set TE6053 to TEST socket on front of the master temperature controller of the group to be tested ; to this effect use loom No.1 connected to PL1 on test set.
R Temperature controller location :
R Group 1 temperature controller 1H868 on panel 2.215
R Group 2 temperature controller 2H868 on panel 1.215
R Group 3 temperature controller 3H868 on panel 1.216
R Group 4 temperature controller 4H868 on panel 2.216.

R (2) On test set, select the following switch positions : K3, L3, G4, A1.

R (3) Set the circuit breakers associated with the relevant group (Ref. paragraph 3B(2) for list of circuit breakers).

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R (4) Make certain that power supply indicator light is on.

R (5) On panel 2.214, place COND VALVE switch 1(2, 3, 4)H866
R in ON position.

R (6) Test

R (a) Carry out tests described in paragraph 3-H.

R (b) Trip the circuit breakers set before test. Place
R COND VALVE switches 1(2, 3, 4)H866 in OFF
R position.

R (c) Disconnect test set.

R E. Test of Temperature Controller H1023, H1024, H1025, H1026

R (1) Flight compartment automatic temperature control
R system - Group 1

R (a) Prepare

R (a1) Connect loom No.2 to test set socket 2.

R (a2) On test set, select K1 position.

R (a3) On panel 2-213, set circuit breaker H1000
R (map reference B17).

R (a4) On panel 1-213, set circuit breaker 1H612,
R map reference D11.

R (a5) On panel 2-214, place group 1 temperature
R control selector H1019 in AUTO 3 position.

R (a6) On panel 2-214, place Group 1 COND VALVE
R switch 1H866 in ON position. On test set,
R power supply indicator light must come on.

R (b) Test

R (b1) Carry out temperature control system tests
R as per paragraph 3-J.

R (b2) At the end of tests, on panel 2-214, place
R temperature selector H1019 in COLD position
R and place COND VALVE switch in OFF position.

R (b3) On test set, make certain that power supply
R indicator light goes off.

R (b4) On panel 2-215, disconnect test set from
R temperature controller H1023.

R (b5) On panel 2-213, trip circuit breaker H1000
R (map reference B17).

R (2) Test of cabin automatic temperature control system -
R Group 2

R (a) Prepare

R (a1) In zone 1-215, connect test set to tempera-
R ture controller H1024 using loom No.2.

R (a2) On test set, select K1 switch position.

R (a3) On 4-213, set circuit breaker H1001 (map
R reference E11).

R (a4) On panel 5-213, set circuit breaker 2H612
R (map reference A9).

R (a5) On panel 2-214, place Group 2 temperature
R selector H1020 in AUTO position.

R (a6) On panel 2-214, place Group 2 COND VALVE
R switch 2H866 in ON position.

R (a7) On test set, power supply indicator light
R comes on.

R (b) Test

R (b1) Carry out temperature control system test as
R per paragraph 3-J.

R (b2) On panel 2-214, place temperature selector
R H1020 in COLD position and COND VALVE switch
R 2H866 in OFF position.

R (b3) On test set, make certain that power supply
R indicator light goes off.

R (b4) In zone 1-215, disconnect test set from tem-
R perature controller H1024.

R (b5) On panel 4-213, trip circuit breaker H1001
R (map reference E11).

R (3) Test of cabin automatic temperature control system -
R Group 3

R (a) Prepare

R (a1) In zone 1-216, connect test set to tempera-
R ture controller H1025 using loom No.2.

R (a2) On test set, select K1 switch position.

R (a3) On panel 2-213 set circuit breaker H1002
R (map reference G16).

R (a4) On panel 15-215, set circuit breaker 3H612
R (map reference A3).

R (a5) On panel 2-214, place Group 3 temperature
R selector 3H1021 in AUTO 3 position.

R (a6) On panel 2-214, place COND VALVE switch 3H866
R in ON position.

R (a7) On test set, power supply indicator light
R comes on.

R (b) Test

R (b1) Carry out temperature control system test as
R per paragraph 3-J.

R (b2) On panel 2-214, place Group 3 temperature
R selector H1021 in COLD position and COND
R VALVE switch 3H866 in OFF position.

R (b3) On test set, make certain that power supply
R indicator light goes off.

R (b4) In zone 1-216, disconnect test set from tem-
R perature controller H1025.

R (b5) On panel 2-213, trip circuit breaker H1002
R (map reference G16).

R (4) Test of cabin automatic temperature control system -
R Group 4

R (a) Prepare

R (a1) In zone 2-216, connect test set to tempera-
R ture controller H1026 using loom No.2.

R (a2) On test set, select K1 switch position.

R (a3) On panel 4-213, set circuit breaker H1003

R (map reference B12).

R (a4) On panel 15-612, set circuit breaker 4H612
R (map reference A23).

R (a5) On panel 2-214, place Group 4 temperature
R selector H1022 in AUTO 3 position.

R (a6) On panel 2-214, place Group 3 COND VALVE
R switch 3H866 and Group 4 COND VALVE switch
R 4H866 in ON position.

R (a7) On test set power supply indicator light
R comes on.

R (b) Prepare

R (b1) Carry out temperature control system tests
R as per paragraph 3-J.

R (b2) On panel 2-214, place Group 4 temperature
R controller H1022 in COLD position and COND
R VALVE switches 3H866 and 4H866 in OFF
R position.

R (b3) On test set, make certain that power supply
R indicator light goes off.

R (b4) In zone 2-216, disconnect test set from tem-
R perature controller H1026.

R (b5) On panel 4-213, trip circuit breaker H1003
R (map reference B12).

R F. Test of Comparison Unit

R (1) Prepare

R (a) In zone 10-215 connect test set to comparison
R unit H1027, using loom No.3.

R (b) On panel 4-213, set circuit breaker H1006 (map
R reference C12).

R (c) Place Group 3 and 4 COND VALVE switches 3H866 and
R 4H866 in ON position.

R (d) On panel 2-214, place Group 3 and 4 switch H1063
R in ON position.

R (e) On panel 2-214 make certain that all temperature

R selectors H1019, H1020, H1021, H1022 are in COLD
R position.

R (2) Test

R (a) Carry out tests as per paragraph 3-K.

R (b) On panel 4-213, trip circuit breaker H1006 (map
R reference C12).

R (c) In zone 10-215, disconnect test set from compa-
R rison unit H1027.

R (d) On panel 5-213, trip circuit breaker H999 (map
R reference B9).

R (e) On panel 2-214 place Group 3 and 4 switch H1063
R in OFF position.

R (f) On panel 2-214, place Group 3 and 4 COND VALVE
R switches 3H866 and 4H866 in OFF position.

R (g) On panel 8-213, remove shunts from module 5UT1890.
R Trip circuit breakers 3H612 on panel 15-215 (map
R reference A3) and 4H612 or panel 15-216 (map
R reference A24).

R G. Test of Semi-Automatic Temperature Control System

R (1) Semi-automatic temperature control system test -
R Group 1

R (a) Prepare

R (a1) On panel 8-216, connect test set to connector
R H1068 using loom No.4. Select K4, L3 switch
R positions.

R (a2) On panel 2-213, set circuit breaker H1000
R (map reference B17).
R On test set, make certain that power supply
R indicator light comes on.

R (a3) On panel 1-213, set circuit breaker H991
R (map reference F11).

R (a4) On panel 2-214, place COND VALVE switch 1H866
R in ON position.

R (b) Tests

(b1) Carry out tests as per paragraph 3-L.

(b2) Place COND VALVE switch 1H866 in OFF position.

(b3) On panel 1-213, trip circuit breaker H991 (map reference F11).

(b4) On panel 2214, place Group 1 temperature selector in COLD position.

(b5) Disconnect test set from panel 8-216.

(2) Test of semi-automatic temperature control system - Group 2

(a) Prepare

(a1) On panel 8-216, connect test set to connector H1068 using loom No.4. Select K4, L3 switch positions.

(a2) On panel 4-213, set circuit breaker H1001 (map reference E11).

(a3) On test set, make certain that power supply indicator light comes on.

(a4) On panel 5-213, set circuit breaker H992 (map reference B8).

(a5) On panel 2-214, place COND VALVE switch 2H866 in ON position.

(b) Tests

(b1) Carry out tests as per paragraph 3-L.

(b2) Place Group 2 COND VALVE switch 2H866 in OFF position.

(b3) On panel 5-213, trip circuit breaker H992 (map reference B8).

(b4) On panel 2-214, place Group 2 temperature selector in COLD position.

(b5) On panel 8-216, disconnect test set from connector H1069.

(3) Test of semi-automatic temperature control system -

R Group 3

R (a) Prepare

R (a1) On panel 8-216, connect test set to connector
R H1070 using loom No.4. Select K4, L3 switch
R positions.

R (a2) On panel 2-213, set circuit breaker H1002
R (map reference G16).
R On test set check that power supply indicator
R light comes on.

R (a3) On panel 15-215, set circuit breaker H993
R (map reference D3).

R (a4) On panel 2-214, place Group 3 COND VALVE
R switch 3H866 in ON position.

R (b) Test

R (b1) Carry out tests as per paragraph 3-L.

R (b2) Place Group 3 COND VALVE switch in OFF
R position.

R (b3) On panel 15-215, trip circuit breaker H993
R (map reference D3).

R (b4) On panel 2-214, place Group 3 temperature
R selector in COLD position.

R (b5) On panel 8-216, disconnect test set from con-
R nector H1070.

R (4) Test of semi-automatic temperature control system -
R Group 4

R (a) Prepare

R (a1) On panel 8-216, connect test set to connector
R H1071. Select K4, L3 switch positions using
R loom No.4.

R (a2) On panel 4-213, set circuit breaker H1003
R (map reference B12). Make certain that power
R supply indicator light comes on.

R (a3) On panel 15-216, set circuit breaker H994
R (map reference C24).

R (a4) On panel 2-214, place Group 4 COND VALVE
R swich 4H866 in ON position.

R (b) Test

R (b1) Carry out tests as per paragraph 3-L.

R (b2) Place Group 4 COND VALVE switch 4H866 in OFF
R position.

R (b3) On panel 15-216, trip circuit breaker H994,
R map reference C24.

R (b4) On panel 2-214, place Group 4 temperature
R selector in COLD position.

R (c) On panel 8-216, disconnect test set from connector
R H1071.

R H. Master Temperature Controller Tests

R (1) Master control unit power supply tests

	ACTION	RESULT REQUIRED	REMARKS
R R	Select A2	DVM should indicate -15 ± 1.8 volts	
R R	Select A3	DVM should indicate +15 ± 1.8 volts	
R R	Select A4	DVM should indicate -10V ± 1V	
R R	Select A5	DVM should indicate +10V ± 1V	
R R	Select A1	DVM should indicate 65V ± 0.5V	

R (2) Mass flow indicator

	ACTION	RESULT REQUIRED	REMARKS

R R	Select A7 & H5	DVM = +0.5 +0.1V −0.1V	Checking Mass Flow sensor
R R	Select H6	DVM = +0.5 +0.1V −0.1V	
R R R R	Select A14 to H1 SIM 3 = 500 SIM 4 = 426 - 500	On panel 2-214 Mass Flow Indicator reads in the green band. DVM reads 0.5 ± 0.1V	
R R R	Set SIM 3 to 470 ± 30	On panel 2-214 Mass Flow Indicator reads F.S.D., DVM reads .75V ± 0.1V	
R R R	Set SIM 3 to 555 ± 30	DVM reads 0 ± 0.1V On panel 2-214 Mass Flow Indicator reads 0.	

R (3) Fuel heat exchanger by pass valve

R	ACTION	RESULT REQUIRED	REMARKS
R R R R R	Select A7 & H4	Voltage reference. Ref. paragraph 3M(1)	Checking Fuel heat exchanger Air Outlet Sensor H890
R R R R R R R	Select H2	DVM shall read 6.4 ± 0.9 Volts	Checking Fuel heat exchanger Fuel Temp Sensor H888 over the Temp Range −10°C to +50°C
R R R R R R R	Select H3	DVM shall read + 6.4 ± 0.9 Volts	Checking Fuel heat exchanger Air Inlet Sensor H889 over the Temp Range −10°C to +50°C
R	Select A11 & H1		

R R R R R R R R R	Set SIM 1 to 350 Set SIM 2 to 550 Set SIM 3 to 150	DVM shall read 1.04V to 1.18V. On panel 2-214, confirm that the respective M1 shows open.	SIM 3 = Air Outlet Sensor = to 106.0 Ω, SIM 1 = Air Inlet Sensor = to 115.7 Ω, SIM 2 = Fuel Inlet Sensor = to 111.8
R	Select A10	DVM shall read 0 ± .05V	
R R R R R R	Set SIM 2 to 300	DVM shall read 1.04 to 1.18V. On panel 2-214, confirm that the respective Fuel Control magnetic indicator displays stripes and then shut after 25+7.0 secs	SIM 2 ≅109.8 Ω Equiv. Sensor Value.
R R R R R	Set SIM 2 to 550	DVM shall read 0±. Volts for approx. 5 secs. and then rises to approx. 1.4 volts for 20± 5 secs. and then fall to 0±0.1 volts On 2.214, confirm that the respective fuel control magnetic indicator displays open.	
R R	Select A11	DVM shall read 1.04 to 1.18 volts.	
R R R R R R	Set SIM 2 to 300	DVM shall read 0±.0.1 volts for approx. 5 secs. and then rises to approx. 1.4 volts for 20 ± 5 secs. and then fall to 0 ± 0.1V volts. On 2.214, confirm that the respective fuel control magnetic indicator displays shut.	
R R R R	Set SIM 2 to 550	DVM indicates 1.04 to 1.18 volts after 30 secs, magnetic indicator displays open.	
R R R R R R	Set SIM 3 to 500	DVM shall read 0±.0.1 volts for approx. 5 secs. and then rises to approx. 1.4 volts for 20 ± 5 secs. and then fall to 0 ± 0.1V volts. On 2.214, confirm that the respective fuel control magnetic indicator displays shut.	
R R R R	Set SIM 3 to 150	DVM indicates 1.04 to 1.18 volts, on 2-214 FUEL CONTROL magnetic indicator displays OPEN after 30 secs	

R (4) Water separator valve

	ACTION	RESULT REQUIRED	REMARKS
R	Select K3, H1, E1, A8.	DVM should read 1.04 to 1.18 volts.	
R	Select A9	DVM should read 0 ± 0.1 volts.	
R	Select A8	DVM should read 1.04 to 1.18 volts.	
R	Select E2	DVM should read 1.50 tp 1.70 volts for approx. 2.0 secs and then fall to 0±.1 volts	
R	Select E1	DVM indicates 1.04 to 1.18 volts.	
R	Select A9	DVM should read 0 ± 0.1 volts.	
R	Select E2	DVM should read 1.04 to 1.18 volts.	
R	Select E1		

R (5) Ambient pressure switch

	ACTION	RESULT REQUIRED	REMARKS
R	H1032 (3, 4, 5) in ZONE 123/124		
R	Disconnect and link B and C of Free Connector	DVM should read 1.04 to 1.18 volts.	
R	Remove links and reconnect.	DVM should read 1.5V to 1.7V for approx. 2 secs and then fall to 0±.1 volts	

R J. Temperature Controller Tests

R (1) Test No.1 power suppliers

	ACTION	RESULT REQUIRED	REMARKS
R R	Select K1, L3, G1, H1.	None	
R	Select D1	DVM shall read 10 ± 1V	
R	Select D2	DVM shall read -10 ± 1V	

R (2) Test No.2 temperature sensors (Temp.Range 10°C to 30°C)

	ACTION	RESULT REQUIRED	REMARKS
R	Select D3	None	

R (a) Cabin ambient temperature sensor

R R R	Select H2	DVM shall read (1.25 to ((4.0VDC.	For temp. 0 to 30°C

R (b) Inlet temperature sensor

R R R	Select H3	DVM shall read (0.75 to ((2.5VDC.	For temp. 30 to -5°C

R (c) Mixed air temperature sensor

R R R	Select H4	DVM shall read (-1.5 to ((-4.5VDC.	For temp. 0 to 30°C

(d) Selector

Select AUTO 1	None	20°C selected

(3) Test No.3 cabin amplifier stage

ACTION	RESULT REQUIRED	REMARKS
Select H1 & D4	None	
SIM 1 to 330 SIM 2 to 151 SIM 3 to 460 SIM 4 to 0000	None None None None	
SIMULATOR - 1		
Adjust to cause DVM to read 0 ± 0.1V	SIMULATOR - 1 shall read between 450 and 600.	
Adjust to 350	DVM shall read less than -5.0VDC (i.e. -5 to -10V)	Equiv. error or ≅ 1°C.

(4) Test No.4 cabin inlet stage - Not limit (+35°C limit)

ACTION	RESULT REQUIRED	REMARKS
Select D4		
SIMULATOR - 1		
Set to 980	DVM shall read >+9VDC	Hot Demand from Cabin Stage.
Select D6	None	Allow DVM to settle.
SIMULATOR - 2		
Adjust to make	SIMULATOR - 2 shall read	

DVM read 0±0.1V	between 130 and 160		
Adjust to 180	DVM shall read less than - 4VDC.		
Adjust to 130	DVM shall read greater than + 4.0VDC.		

(5) Test No.5 cabin inlet stage (-2°C Cold limit Group 1 only)

ACTION	RESULT REQUIRED	REMARKS
Select D4	None	
SIMULATOR - 1		
Set to 100	DVM shall read -9±1.0V	COLD Demand.
Select D6	None	
SIMULATOR - 2		
Set to 375	None	Allow DVM to settle.
R Adjust to make DVM read 0±0.1V	SIMULATOR 2 shall read between 350 & 390	Decrease SIM. to increase voltage.
Adjust to 310	DVM shall read greater than + 4.0VDC.	
Adjust to 400	DVM shall read < -4.0V	

(6) Test No.6 cabin inlet stage (-10°C Limit Groups 2, 3 & 4 only)

ACTION	RESULT REQUIRED	REMARKS
Select D4	None	
SIMULATOR - 1		

R	Set to 100	DVM shall read -9±1.0VDC	
R	Select D6	None	
R	SIMULATOR - 2		
R R	Set to 400	None	Allow DVM to settle.
R	SIMULATOR - 2		
R R R	Adjust to make DVM read 0 ± 0.1VDC.	SIMULATOR 2 shall read between 380 to 470	
R R	Adjust to 510	DVM shall read less than - 4V d.c. (i.e. -4 to -10V)	
R R	Adjust to 350	DVM shall read greater than + 4V d.c.	

R (7) Test No.7 mixed air stage

R	ACTION	RESULT REQUIRED	REMARKS
R R R	SIM 1 Set to 100 SIM 2 Set to 210 SIM 3 Set to 180	None None None	COLD DEMAND
R R R	Select D9 & G4	None	Wait until DVM stabili-zed.
R	SIMULATOR - 3		
R R R	Adjust until DVM reads +1.2 ± 0.2V	None	Increase SIM. to decrease voltage.
R	Select D10		
R	SIMULATOR - 3		
R R R	Adjust slowly until DVM reads 1.7 ± 0.1VDC	SIMULATOR 3 shall read between 670 to 850	Increase SIM 3 to decrease volts.

R R R R	-25°C COLD LIMIT 123/124 Ambient Pressure Switch H103 (2, 3, 4, 5)			
R R	Link pins B & C	None	SIM. above 30,000 ft.	
R R	C/B (1, 2, 3, 4) H862			
R	Reset	None		
R	Select G3	None		
R R R	SIM 3 Adjust until DVM reads 1.7 ± 0.1VDC.	SIM 3 shall read between 400 & 800.		
R R R	+80° HOT LIMIT SIM 1 Set to 800			
R R	SIM 2 Set to 210			
R	Select G4			
R R R	SIM 3 Adjust for 1.7 ± 0.1VDC.	SIM 3 shall read between 50 & 70.		

R (8) Test No.8 ice detector tests

	ACTION	RESULT REQUIRED	REMARKS
R R R R R R	SIM 1 Set to 220 SIM 2 Set to 110 SIM 3 Set to 250	None	Ensure A/C is above 30,000 ft. Link pins B & C of Press Switch.
R R	Select D6	DVM shall read + 10VDC ± 1V	

R	Select D10	DVM shall read .OVDC. ± 0.1V	
R	Select D11		
R	SIMULATOR - 4 Adjust till DVM reads 8v DC ±0.1V		
R	(1,2,3,4) H862 C/B		
R	Trip	On test set confirm DVM reads 0 ± 0.2VDC.	
R	As above) Reset	DVM reads 8 ± 0.1 VDC	
R	Select D6	DVM shall read -9±1.5VDC	
R	Select D10	DVM shall read 4.0 + 0.5 -0.1VDC.	
R	Select D6	DVM shall read -9±1.5VDC	
R	SIM 4 Set to Zero	DVM shall read 9±1.5VDC.	

R K. Comparison Unit Tests

R (1) Test 1

R SET-UP - Power Supplies

	ACTION	RESULT REQUIRED	REMARKS
R	Select K2, L3, B1 & G3 SIM 1 Set to 140 SIM 2 Set to 140		
R	GROUPS 3 & 4 COND VALVE switches and GROUPS 3 & 4 FAIL switch		
R	Select ON	On the Test Set confirm	

	that the Power On light is illuminated.	
Select B1	DVM should read +14V ±1V	
Select B2	DVM should read -20V ±1V	

(2) Test 2

Comparison unit amplifier test A1

ACTION	RESULT REQUIRED	REMARKS
Select B4 - allow DVM to stabilise		
SIM 2 Adjust for DVM indication 0V	SIM 2 should be 140 ± 2	
SIM 2 Adjust to 135	confirm DVM indicates a positive voltage	
SIM 2 Adjust to 145	confirm DVM indicates a negative voltage	
SIMULATOR - 2		
Adjust to 110	Confirm that COMPARATOR caption on 2-214 illuminates within 60 sec.	
SIM 2 Adjust to 140	Confirm that COMPARATOR caption on 2-214 goes out within 30 sec.	
SIM 2 Adjust for DVM indication 0V.		
Select B6	Confirm DVM indicates 1.5 ± 0.5V	

(3) Test 3

Relay A1 tests

ACTION	RESULT REQUIRED	REMARKS
SIMULATOR - 4		
Select B11, F1 Adjust for DVM indication approx. 5V		
GROUP 1 FAIL switch Set to FAIL	DVM indicates less than 5V	
Select F2	DVM indicates 5V	
GROUP 1 FAIL switch Set to NORMAL	DVM indicates less than 5V	
Select F1	DVM indicates 5V	

(4) Test 4

R Relay B1 & B4 Tests

ACTION	RESULT REQUIRED	REMARKS
Select B12 & F1	DVM indicates approx. 5V	
GROUP 1 FAIL switch Set to FAIL	DVM indicates less than 5V	
Select F2	DVM indicates 5V	
GROUP 1 FAIL switch Set to NORMAL	DVM indicates less than 5V	
GROUP 2 FAIL switch Set to FAIL	DVM indicates 5V	
Select F1	DVM indicates less than	

	5V	
GROUP 2 FAIL switch Set to NORMAL	DVM indicates 5V	

(5) Test 5

Relay D2, C4 & F4 Tests

ACTION	RESULT REQUIRED	REMARKS
Select B13 & F1	DVM indicates approx. 5V	
GROUP 1 FAIL switch Set to FAIL	DVM indicates less than 5V	
Select F2	DVM indicates 5V	
GROUP 1 FAIL switch Set to NORMAL	DVM indicates less than 5V	
GROUP 2 Fail switch Set to FAIL	DVM indicates 5V	
Select F1	DVM indicates less than 5V	
GROUP 2 FAIL switch Set to NORMAL	DVM indicates 5V	

(6) Test 6

Relay D2 & C4 Tests

ACTION	RESULT REQUIRED	REMARKS
Select B14, F1.	DVM indicates approx. 5V	
GROUP 2 FAIL switch Set to FAIL	DVM indicates 5V	
Set to NORMAL	DVM indicates 5V	

R R	GROUP 1 FAIL switch Set to FAIL	DVM indicates less than 5V	
R	Select F2	DVM indicates 5V	
R R	GROUP 1 FAIL switch Set to NORMAL	DVM indicates less than 5V	
R	Select F1	DVM indicates 5V	

R L. Semi-Automatic Temperature Control Tests

	ACTION	RESULT REQUIRED	REMARKS
R R	Select K4, G1, C1 and L3	None	
R R	Temperature Selector		
R R R R R R R	Check ambient temperature of the day (not flight compt. temp.) and set the selector in accordance with paragraph 3R(2).	None	Wait 60 secs before proceeding with test.

R (1) Power supply

	ACTION	RESULT REQUIRED	REMARKS
R R R R	Select C1 and J2 and wait until the DVM Voltage stabilizes	DVM shall read 20 ± 1.0V	

R (2) Temperature sensor test

	ACTION	RESULT REQUIRED	REMARKS

Select J1 and C2	DVM shall read 9.6±0.6 volts	

(3) Functioning tests

ACTION	RESULT REQUIRED	REMARKS
Select J3 and C1		
Temperature selector		
Set to STANDBY 0		
SIM 3 Adjust until DVM reads 2.5V	Simulator 3 shall read in the range 510 to 560. Note this value of SIM 3 and designate as M	
Temperature Selector Select STANDBY -3	None	
SIM 3 Adjust until DVM reads 2.5V	Simulator 3 shall read M + 41 ± 2	
Temperature Selector Select STANDBY 6	None	
SIM 3 Adjust until DVM reads 2.5V	Simulator 3 shall read M - 285 ± 5	

M. Fuel Heat Exchanger Air Outlet Sensor Ambient Temperature

(1) Required reference

FUEL HEAT EXCHANGER AIR OUTLET SENSOR		
SENSOR AMBT	SENSOR NOMINAL	REQUIRED REFERENCE LIMIT

R	TEMP °C	RES.OHMS	LOW LIMIT	NOMINAL	HIGH LIMIT
R	- 10	10970	1.788	2.061	2.352
R	- 9	10410	1.753	2.021	2.307
R	- 8	9880	1.718	1.981	2.262
R	- 7	9380	1.683	1.941	2.216
R	- 6	8910	1.648	1.901	2.171
R	- 5	8480	1.616	1.862	2.125
R	- 4	8042	1.579	1.820	2.077
R	- 3	7644	1.544	1.780	2.032
R	- 2	7266	1.509	1.740	1.986
R	- 1	6910	1.474	1.700	1.940
R	0	6572	1.441	1.660	1.893
R	1	6242	1.405	1.619	1.846
R	2	5932	1.370	1.578	1.800
R	3	5640	1.335	1.538	1.755
R	4	5350	1.299	1.497	1.708
R	5	5094	1.265	1.458	1.664
R	6	4850	1.232	1.420	1.620
R	7	4613	1.198	1.381	1.576
R	8	4398	1.167	1.345	1.535
R	9	4185	1.134	1.307	1.492
R	10	3936	1.095	1.261	1.439
R	11	3789	1.070	1.233	1.407
R	12	3618	1.041	1.200	1.369
R	13	3446	1.010	1.165	1.329
R	14	3284	0.981	1.131	1.291
R	15	3128	0.952	1.097	1.252
R	16	2988	0.925	1.066	1.216
R	17	2856	0.898	1.035	1.181
R	18	2730	0.872	1.006	1.148
R	19	2608	0.847	0.976	1.114
R	20	2492	0.822	0.947	1.081
R	21	2384	0.798	0.920	1.050
R	22	2282	0.775	0.893	1.019
R	23	2184	0.752	0.867	0.990
R	24	2090	0.730	0.842	0.961
R	25	2000	0.709	0.817	0.932
R	26	1915	0.688	0.793	0.904
R	27	1834	0.667	0.769	0.878
R	28	1757	0.648	0.747	0.852
R	29	1682	0.628	0.724	0.826
R	30	1611	0.609	0.702	0.802
R	31	1545	0.592	0.682	0.773
R	32	1481	0.574	0.662	0.755
R	33	1418	0.557	0.642	0.733
R	34	1360	0.540	0.623	0.711
R	35	1304	0.524	0.605	0.690
R	36	1251	0.509	0.587	0.670
R	37	1200	0.494	0.570	0.650

38	1152	0.480	0.553	0.632
39	1105	0.466	0.537	0.613
40	1060	0.452	0.521	0.595
41	1021	0.440	0.508	0.579
42	981.9	0.428	0.494	0.563
43	945.1	0.417	0.480	0.548
44	909.5	0.406	0.467	0.533
45	875.3	0.395	0.455	0.519
46	841.7	0.384	0.442	0.505
47	808.9	0.373	0.430	0.491
48	778.1	0.363	0.419	0.478
49	747.9	0.353	0.407	0.465
50	710.3	0.341	0.393	0.448

RB The resistance values in the above Table also apply to the
RB following temperature sensors:

RB Fuselage mini/max H1040, H1041, H1042, H1043

RB Ambient H1044, H1045, H1046, H1047

RB Wing mini/max H1048, H1049, H1050, H1051

RB Semi-automatic H1064, H1065, H1066, H1067

(2) Ambient temperature - Required setting of temperature selector.

TEMP °C	SELECTOR SETTING
- 10° to - 7.4°	STANDBY -1
- 7.4° to - 2.5°	NEXT POSITION
- 2.5° to + 2.25°	STANDBY 0
2.25° to 8°	NEXT POSITION
8° to 13.25°	STANDBY 1
13.25° to 17.5°	NEXT POSITION
17.5° to 29.5°	STANDBY 2
29.5° to 48°	NEXT POSITION
48° and above	STANDBY 6

(3) Temperature sensor value

Temp. ° C	RT Ohms
-10	96.04
0	100.00
10	103.95
20	107.89
30	111.82
40	115.74
50	119.64
60	123.54
70	127.42
80	131.29
90	135.14
100	139.00

RB The resistance values in the above Table apply to the
RB following temperature sensors:

RB Fuel 1H888, 2H888, 3H888, 4H888

RB Fuel heat exchanger 1H889, 2H889, 3H889, 4H889
RB air inlet
RB

1. General

Under normal conditions, the flight compartment air conditioning is achieved by group 1. The temperature control system provides a flight compartment temperature ranging between 15°C and 30°C This control system :

- Limits air temperature in the duct downstream of the cold air unit turbine
- Limits air temperature in the distribution duct supplying the flight compartment.
- Enables de-icing of the duct, if necessary, downstream of the cold air unit turbine
- Allows manual adjustment of air temperature downstream of the cold air unit turbine, in case of a failure in the automatic control of the group.

2. Description (Ref. Fig. 001)

A. The flight compartment temperature control system mainly consists of the following items :

(1) A temperature control valve H1036

(2) A temperature control valve position indicator H1015

(3) A temperature controller H1023

(4) A comparison unit H1027

(5) A temperature selector H1019

(6) An ice sensor transducer H1052

(7) An ambient pressure switch H1032

(8) Four temperature sensors H1040, H1044, H1048, H1064.

(9) An ambient temperature indicator 1D163

(10) A dual air conditioning temperature indicator 1D164

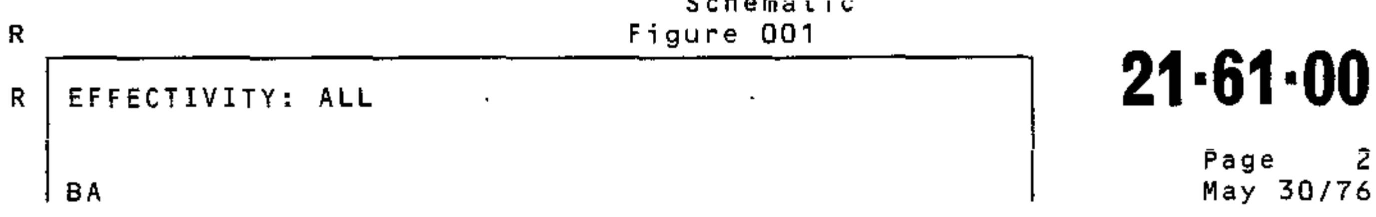
(11) Three sensors 1D165, 1D166, 1D167 associated with indicators 1D163 and 1D164.

(12) A sample duct fan H1028

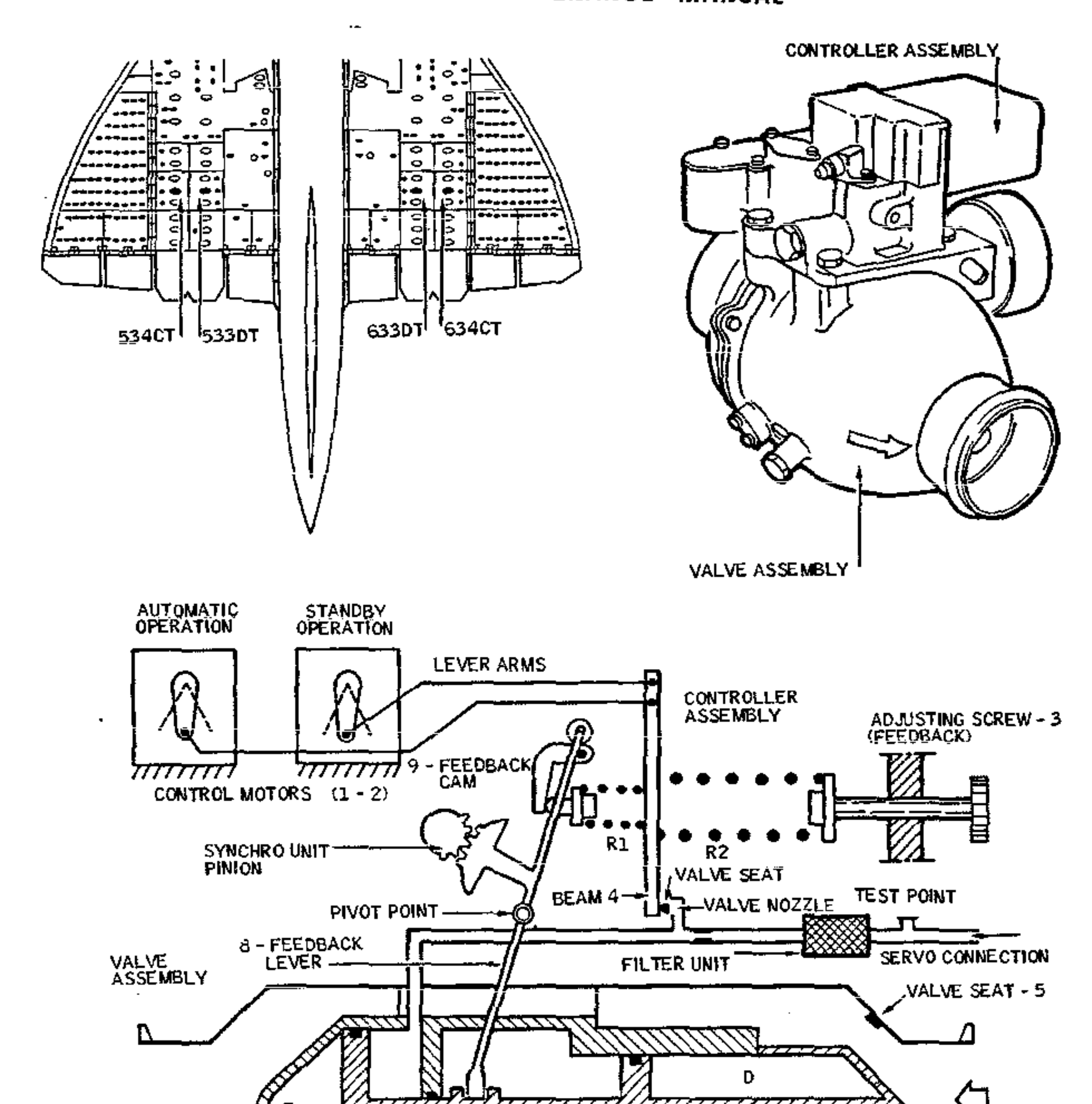
3. Valve - Temperature Control (Ref. Fig. 002)

FUEL
DUCT
TEMP CONT VALVE
FLIGHT DECK
FWD CAB
FAILED
STANDBY
AMBIENT TEMPERATURE SENSOR 1D165
AMBIENT TEMPERATURE SENSOR H1044
TEMPERATURE CONTROLLER H1023
TEMPERATURE CONTROL VALVE H1036
CAU INLET TEMPERATURE SENSOR 1D167
C
T
SAMPLING DUCT FAN H1028
FUSELAGE MINI-MAXI TEMPERATURE SENSOR H1040
CAU OUTLET ICE SENSOR TRANSDUCER H1052
CAU OUTLET TEMPERATURE SENSOR 1D166
WING MINI MAXI TEMPERATURE SENSOR H1048
SEMI AUTO TEMP.SENSOR H1064
DISTRIBUTION CHAMBER
H1027 COMPARISON UNIT
AMBIENT PRESSURE SWITCH H1032
WATER SEPARATOR H1056
CMA 21 61 00 0 AAM0

Flight Compartment Temperature Control - Schematic
Figure 001


R
R EFFECTIVITY: ALL
BA

Printed in England



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Temperature Control Valve
Figure 002

A. Description

A temperature control valve (T.C.V.) associated with each air conditioning group is placed on a line by-passing the cold air unit and allows in conjunction with temperature control system variations in flight compartment air temperature to be made.
The temperature control valve is mainly composed of :

- The valve assembly
- The controller assembly

(1) The valve assembly consists of :

- A joined inlet and outlet casing housing cylinder (7).
- A hollow shaft piston (6). The rear part of the piston acts as a valve which comes into contact with valve seat (5) when the temperature control valve is closed

The front part of the piston is divided into two chambers :

- Chamber E which is acted upon by inlet pressure
- Chamber B which is acted upon by upstream servo-pressure

The piston houses feedback lever (8).

(2) The controller assembly consists of :

- Two control motors (1) and (2). One is controlled automatically by the temperature control system, the other manually by the temperature selector. The motors are connected to one end of beam (4). The other end of beam (4) vents to a greater or lesser extent the servo pressure through a valve seat.
- A feedback mechanism composed of lever (8), cam (9) and spring (R1)
- An adjusting screw (3) which through spring (R2) establishes the operating level of the controller assembly.
- An external indicator which indicates the open or shut position of the valve
- An external line which delivers the servo pressure from upstream of the temperature control valve.
- A synchro unit which provides electrical information of temperature control valve position to the temperature control valve indicator.

B. Operation

(1) Valve and Controller Assembly

The servo pressure supplies chamber B. A certain amount of pressure can be vented through the valve nozzle depending on beam position.

When the temperature in flight compartment is to be increased, one control motor (automatic or manual control) pivots the beam which closes the valve nozzle. The reduction in servo pressure venting causes an increase in pressure in chamber B.
The dual piston displaces and the valve unseats.
The hot air is then delivered downstream of the temperature control valve.
When the temperature in flight compartment reaches the desired value, the motor acts on the beam which opens the valve nozzle. The pressure in chamber B decreases. The pressure in chamber E increases and causes the dual piston to move, returning the valve against its seat. The hot air is no longer delivered downstream of the temperature control valve.

(2) Feedback Mechanism

This mechanism prevents excessive piston displacement in relation to the signal received.
Lever (8) driven by the piston acts on cam (9) which in turn acts on spring (R1) itself counteracting beam (4). Thus the piston follows strictly the order given by either of the motors.

4. Indicator-Temperature Control Valve Position (Ref. Fig. 003)

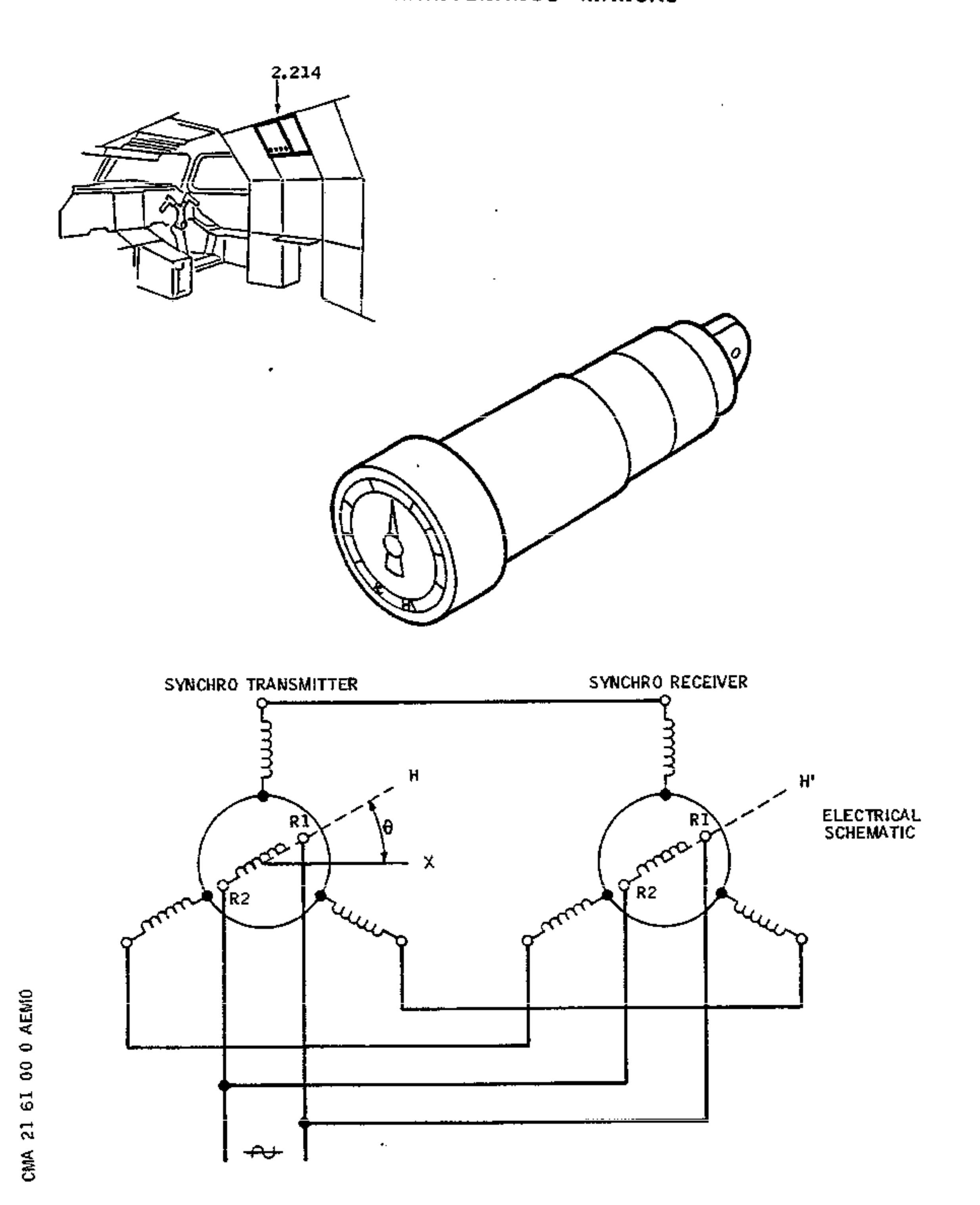
A. Description

The indicators are installed on Flight Engineer's panel 2-214 and are each associated with a temperature control valve.
They include :

(1) A synchro-receiver fitted with a pointer moving over a graduated dial.
Letter C engraved on the dial corresponds to the closed position of the valve, and letter H to the open position of the valve.

(2) An integral lighting circuit

(3) A casing fitted with an electrical connector at the



Temperature Control Valve Position Indicator
Figure 003

rear.

B. Operation

The synchro-transmitter (temperature control valve) and the synchro-receiver (indicator) have the same electrical characteristics.
When winding R1-R2 of the transmitter moves through an angle π along reference direction X, this generates an alternating magnetic field which induces voltages at terminals of stator windings. This results in production of three in-phase currents in the windings of the synchro-receiver stator.
The currents generate three alternating magnetic fields the resultant H of which is parallel to field H.
The rotor of the synchro-receiver linked to the indicating pointer thus reproduces the position of the synchro-transmitter rotor.

5. Controller - Temperature

A. Description (Ref. Fig. 004)

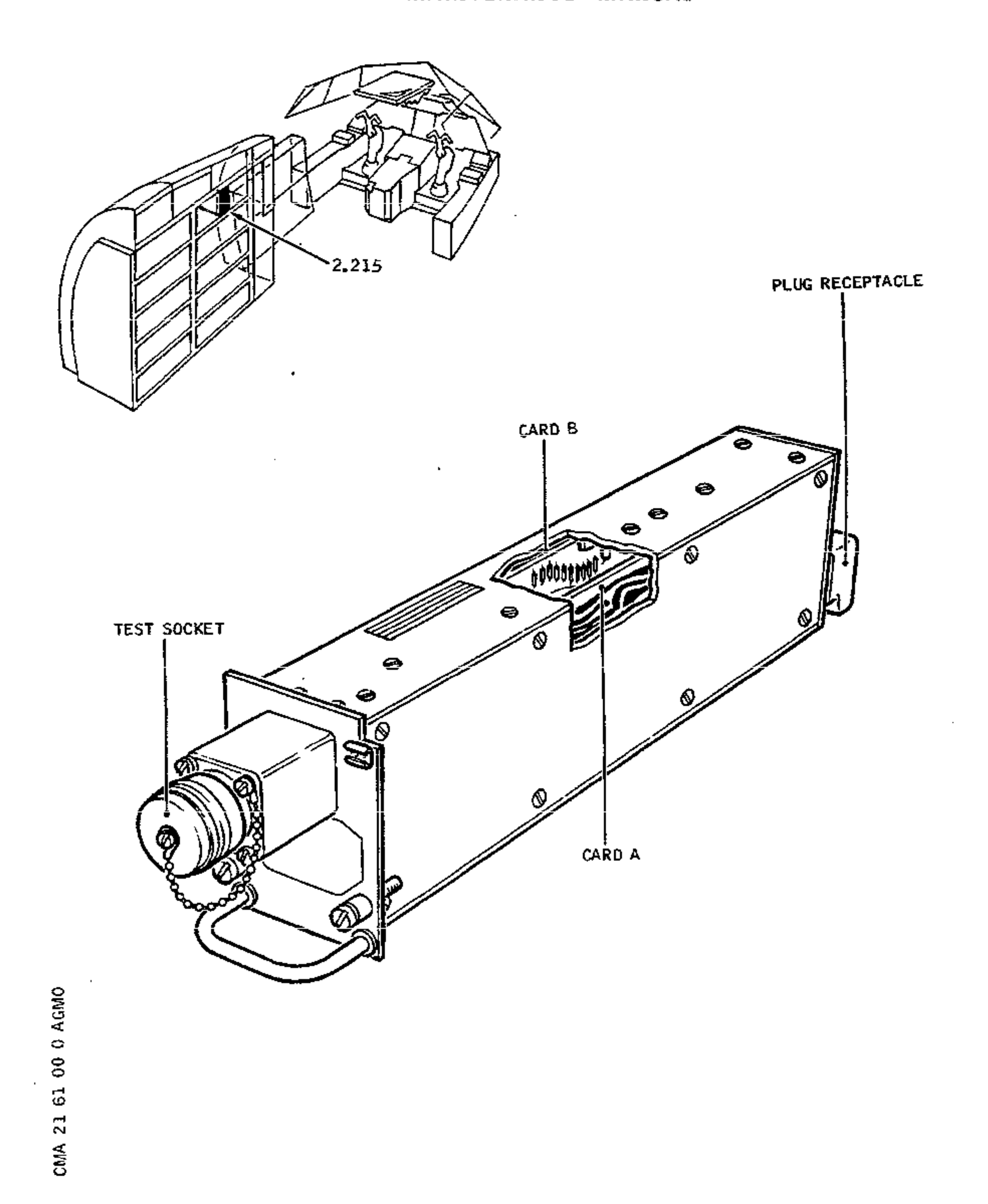
The temperature controller is a transistorized unit located in electronics rack 1-215. It consists of two printed cards A and B. An electrical receptacle is provided at the rear face for connection to aircraft electrical network. The front face carries a test socket which enables a check of input signals without removing the temperature controller.

B. Operation (Ref. Fig. 005)

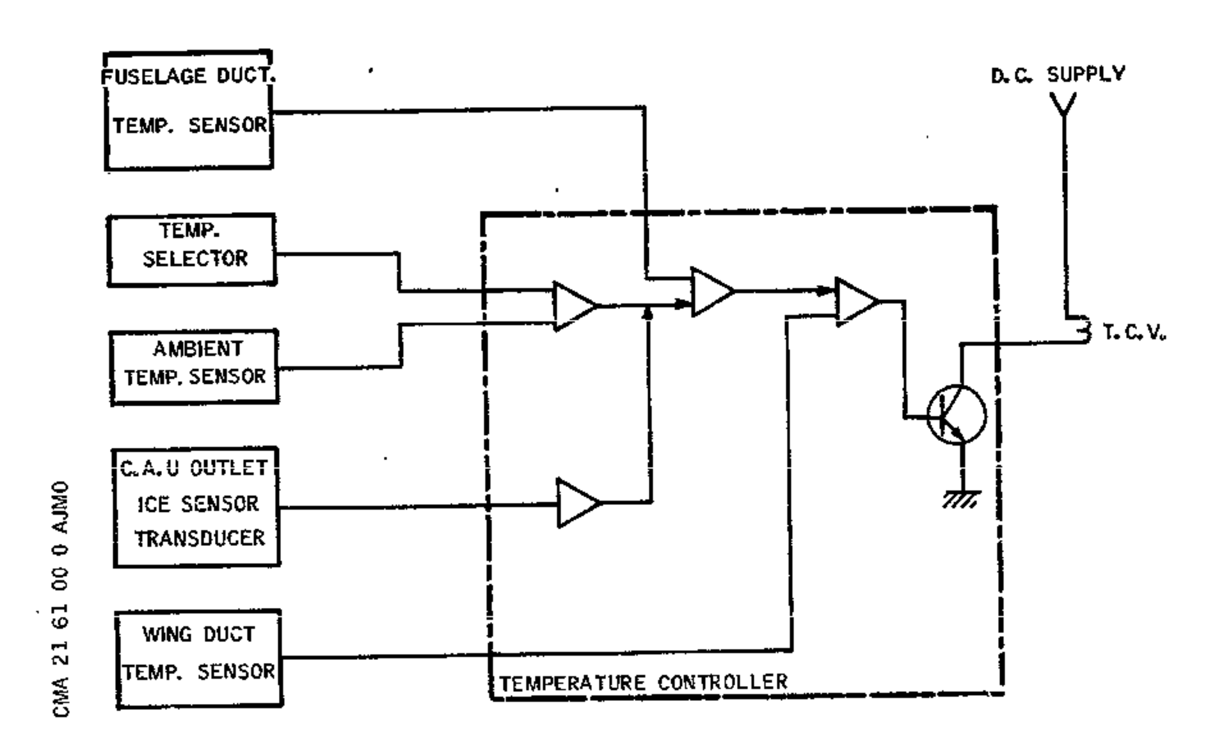
Any variation in flight compartment desired temperature (set at the temperature selector) and the actual temperature displayed by the ambient temperature sensor generates an error signal.
This error signal is varied according to the temperature in mixing duct and fan duct. Additionaly, in case of mixing duct icing detection, the signal level is raised until icing phenomenum has disappeared (efficient above 30,000 feet).
The resulting signal is then applied to the temperature control valve motor. The valve opens or closes depending on the temperature desired.

NOTE : The temperature controller only operates in automatic mode with the temperature selector placed in AUTO position.

6. Comparison Unit



Temperature Controller
Figure 004



Temperature Controller - Schematic Diagram
Figure 005

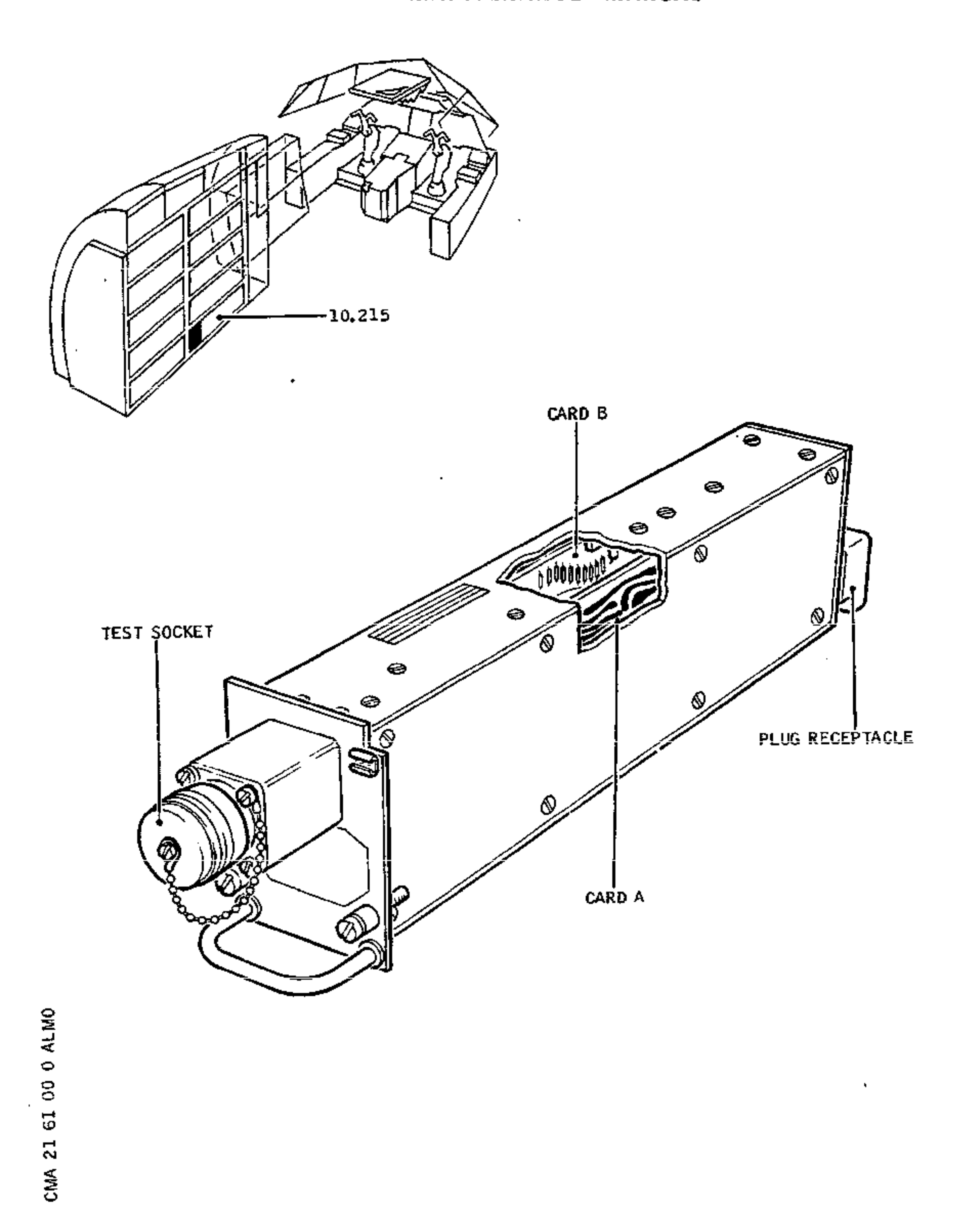
A. Description (Ref. Fig. 006)

The comparison unit is an electronic unit incorporating two printed circuit boards A and B and located in electronics rack 10-215. At the rear is an electrical receptacle for connection to aircraft electrical network.
The front face carries a test socket to check input and output signals without having to remove the comparison unit.
The comparison unit is common to the four air conditioning groups.
It mainly consists of :

- 3 supply rectifiers
- 1 comparison circuit between groups 3 and 4
- Switching relays

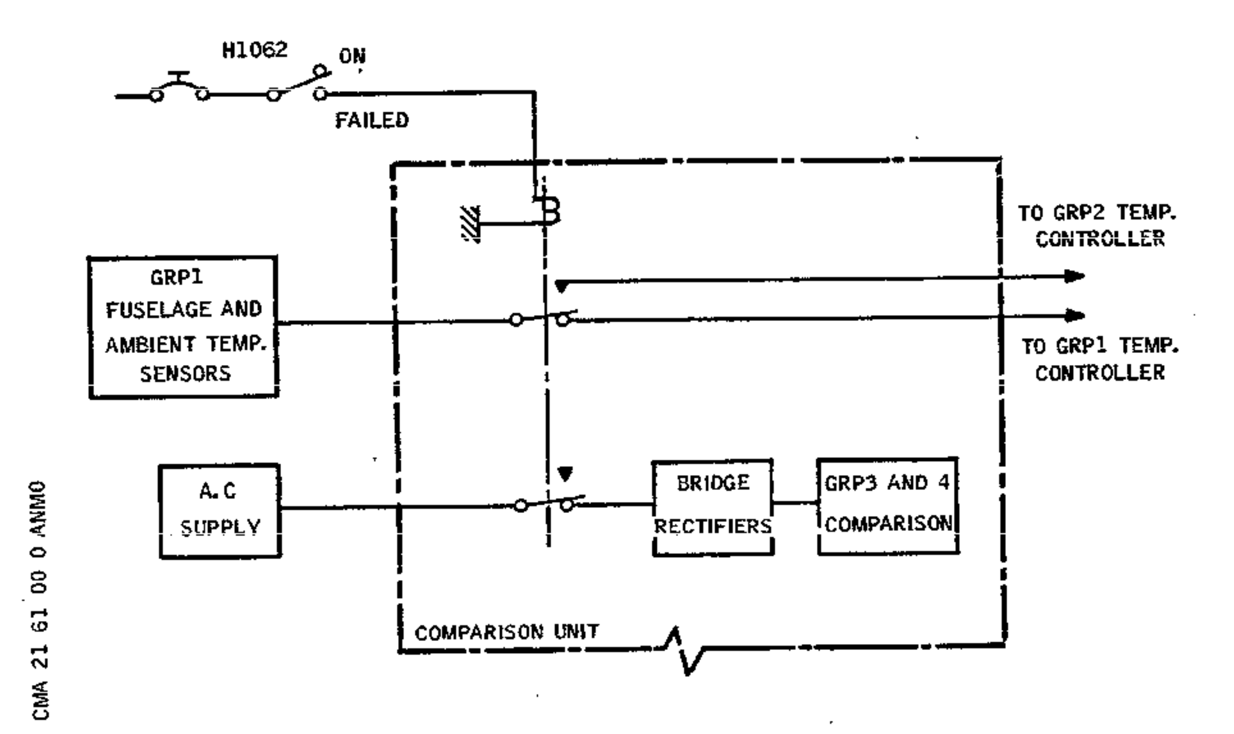
B. Operation (Ref. Fig. 007)

Under normal conditions, that is, when group No.1 supplies the flight compartment with conditioned air, GROUP1 switch H1062 is in ON position.



CMA 21 61 00 0 ALMO

Comparison Unit
Figure 006



GRP1 Section of Comparison Unit - Schematic
Figure 007

The signals from ambient temperature sensors and from duct temperature sensors in flight compartment are sent to temperature controller of group 1.
The 115V - 400Hz electrical supply is rectified to power the comparison circuit between groups 3 and 4.
In the event of a failure of group 1, in addition to closure of the group valves, it is necessary to place GROUP1 switch H1062 in FAILED position.
The switching relays within the comparator unit are energized.
The signals from the ambient temperature sensors and duct temperature sensor in flight compartment are then fed to the temperature controller of group 2 which then supplies flight compartment with conditioned air.
The electrical supply to the comparison circuit between groups 3 and 4 is cut off.

NOTE : When flight compartment temperature control is manually operated by positioning temperature selector of group 1 in STANDBY position, the comparison circuit associated with group 1 is switched off.

7. Selector Temperature

A. Description (Ref. Fig. 008)

The temperature selectors are placed on Flight Engineer's panel 2-214. They are each associated with one air conditioning group. The temperature selector of group 1 controls flight compartment temperature.
It is a unit which carries on the rear an electrical receptacle. The front face is a dial made from electroluminescent material.
The control switch moves over the dial and is mechanically linked to four contact wafers.
The temperature selector provides two modes of operation, AUTO and STANDBY.
A test socket by-passed from the receptacle enables checking of input and output signals of the selector if required.

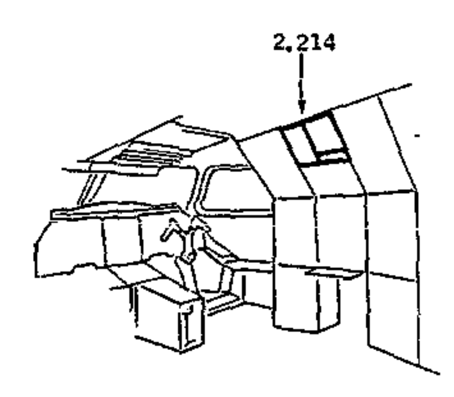
B. Operation (Ref. Fig. 009)

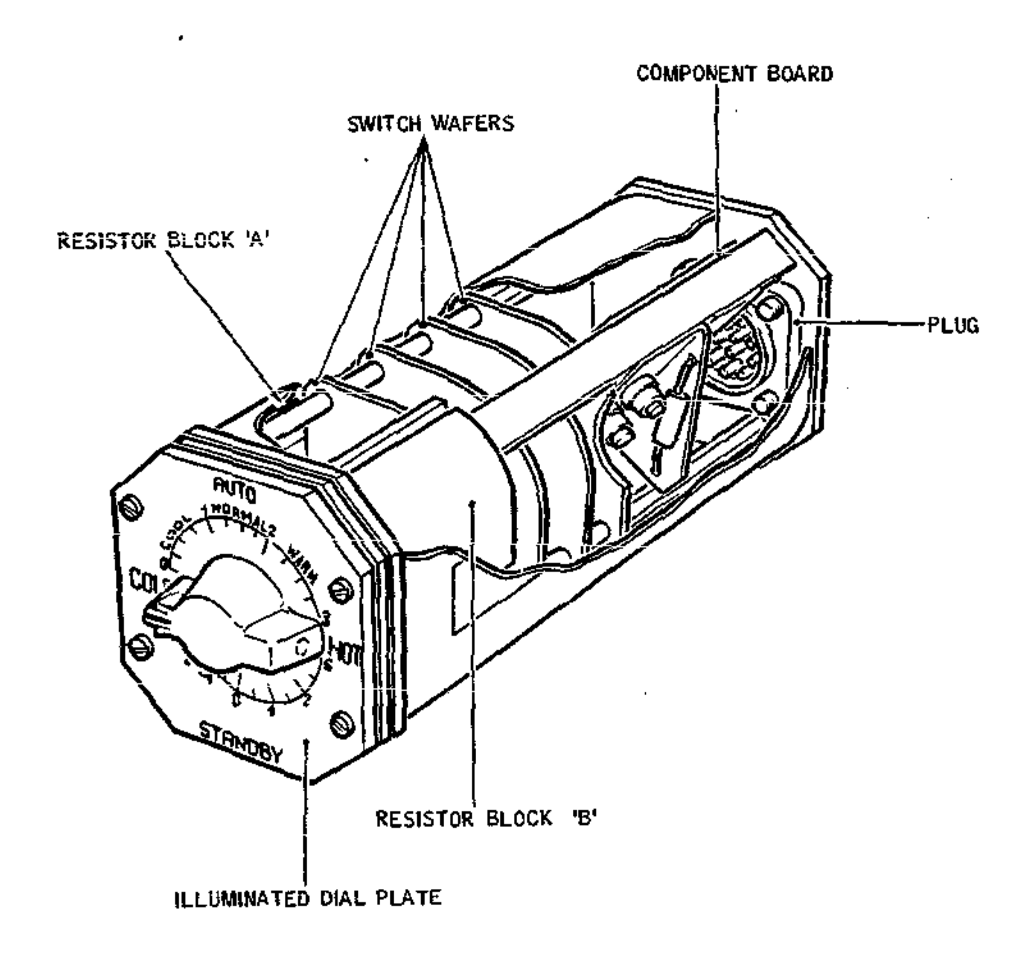
Contacts 16 to 29 of washers A and C are activated when the switch is placed in AUTO position.
Contacts 1 to 14 of wafers B and D are activated when the switch is placed in STANDBY position.
Contact 15 (COLD) correspond to the OFF position of the system.
Contact 30 (HOT) is the control switch mechanical stop.

(1) AUTO Mode

When the control switch is in one of the AUTO positions, wafer A supplies the 115V, 400Hz aircraft voltage to the temperature controller, wafer C connects one of the resistors of block A to temperature controller circuit.
The desired value for flight compartment temperature will be a function of the position of the control switch, therefore a function of the selected resistance.
The relationship between the desired temperature and the markings on the dial of the AUTO section of the selector is approximately as follows :

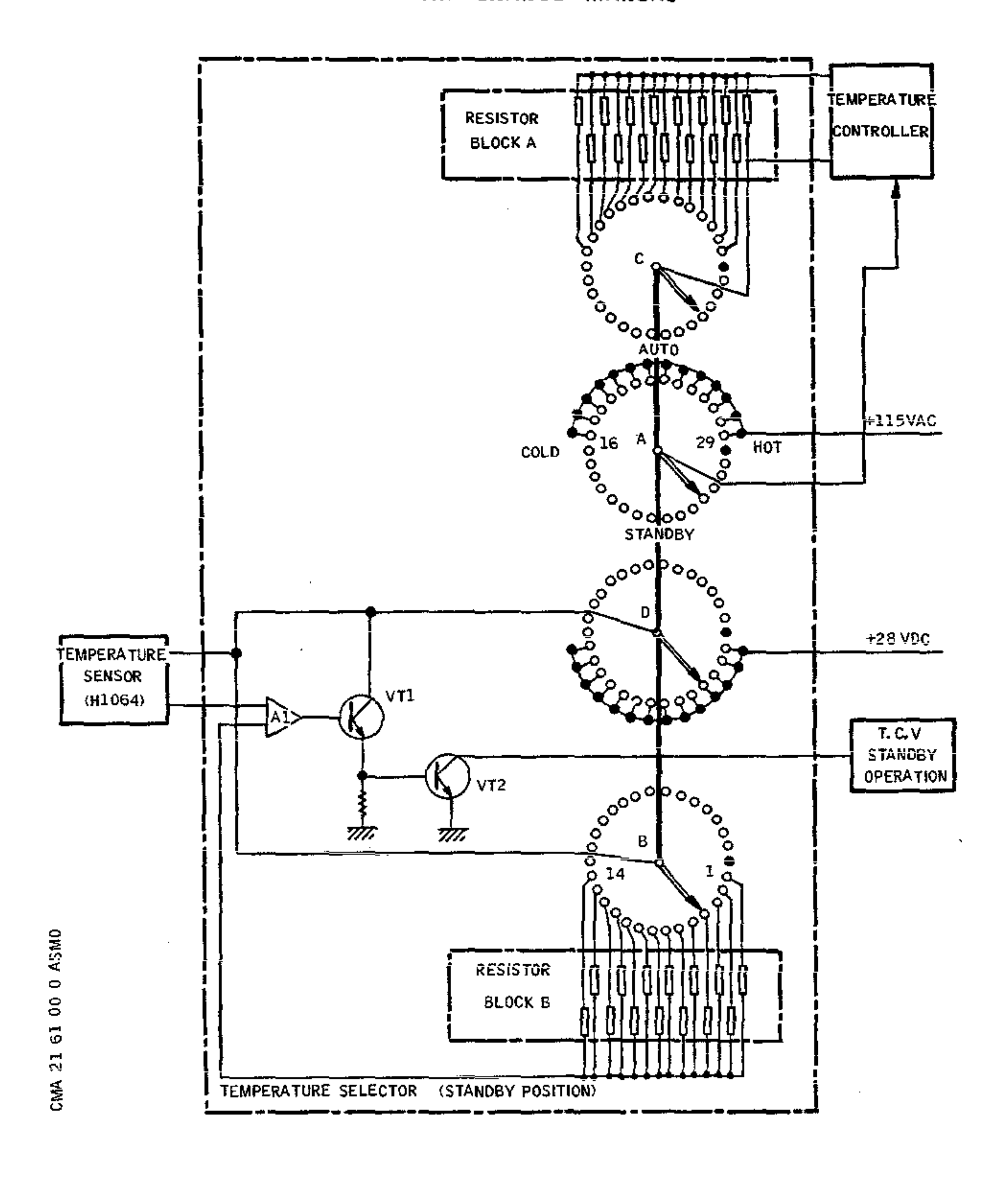
Markings	0	COOL	1	NORMAL	2	WARM	3	HOT
Compartment Temperature in °C	15	18	20	22	24	26	28	30





CMA 21 61 00 0 AQM0

Temperature Selector
Figure 008



Temperature Selector - Schematic
Figure 009

(2) STANDBY Mode

When the control switch is placed in one of the STANDBY positions, wafer D supplies 28V to the selector STANDBY circuit and wafer B connects one resistance of block B to amplifier A1 input.
When the resistance of the semi-automatic temperature control sensor H1064 is the same as that selected by the control switch (flight compartment temperature = selected temperature) there is no difference of potential at A1 input. In that case, A1 input is + 10 V and the current crossing transistor VT1 unlocks transistor VT2 which controls the temperature control valve (standby operation). When the resistance of sensor H1064 differs from that selected by the control switch, a difference of potential appears at amplifier A1 input. As the value of sensor H1064 resistance is lower or greater than the resistance selected in the control switch, so the polarity of the difference of potential at A1 input will vary.
The output voltage at A1 will increase or decrease and unlock or lock transistor VT2 to control temperature control valve. This control valve will change the temperature of the mixed air in flight compartment which in turn will change the value of sensor H1064 resistance until a value equal to that of the selected value is obtained.
The relationship between the desired mixing temperature and the marking on the dial of the STANDBY section of the selector is approximately as follows :

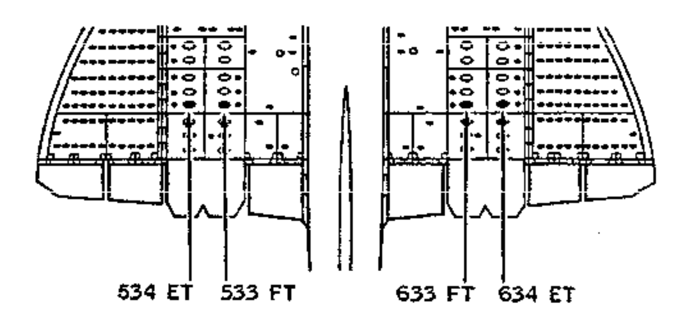
Marking	-3	-2	-1	0	1	2	6	HOT
Mixing temperature in °C	-30	-20	-10	0	10	20	60	80

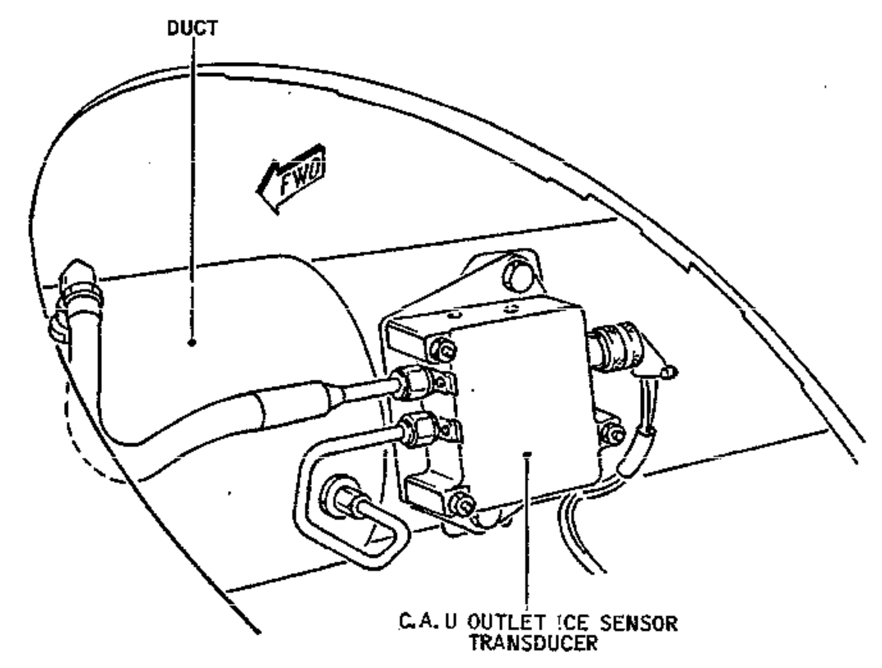
8. Transducer - Ice Sensor (Ref. Fig. 010)

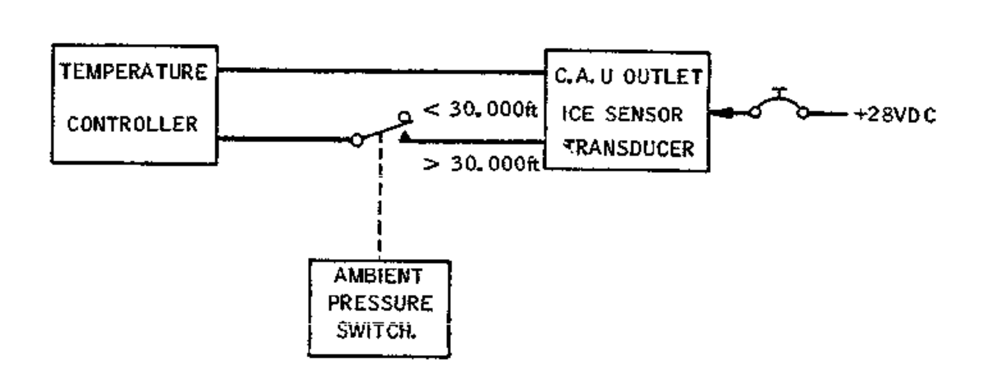
A. Description

The ice sensor transducer is located in the wing in a duct downstream of the cold air unit. This transducer is a differential pressure transducer which produces a voltage proportional to the difference in pressure on each side of a filter placed inside the duct.
The components are housed in a casing consisting of :

- An electrical connector







CMA 21 61 00 0 AUMO

Ice Sensor Transducer
Figure 010

- Two unions, one upstream and one downstream of the duct filter

The transducer circuit is activated only when the aircraft flies at 30,000 feet and when the temperature selector is placed in AUTO mode.

B. Operation

(1) Normal Operation

If there is no ice, the conditioning air passes directly through transducer filter. The pressure upstream equals the pressure downstream. There is no differential pressure, therefore no resulting signal. The temperature control in the flight compartment is normal.

(2) Icing of Duct at an Altitude above 30,000 feet

The ice in the duct partially obstructs the transducer filter. The pressure upstream becomes greater than the pressure downstream of the filter. The difference in pressure produces an electrical signal which is transmitted to the temperature controller, thus opening the temperature control valve. The resulting increase in temperature in the duct causes de-icing of the filters.

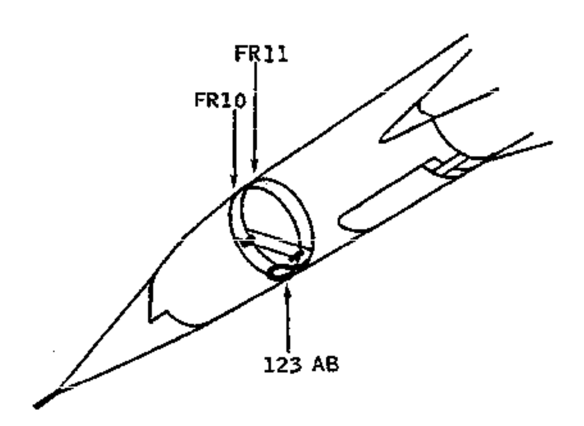
9. Switch - Ambient Pressure (Ref. Fig. 011)

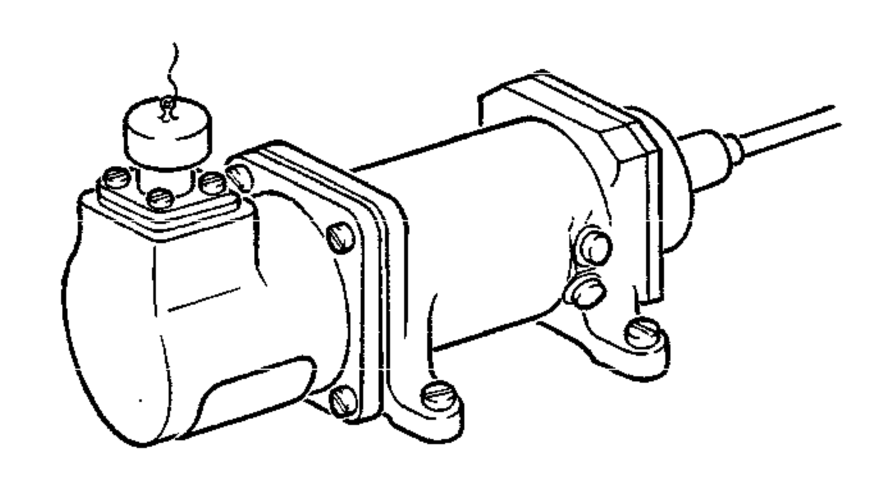
A. Description

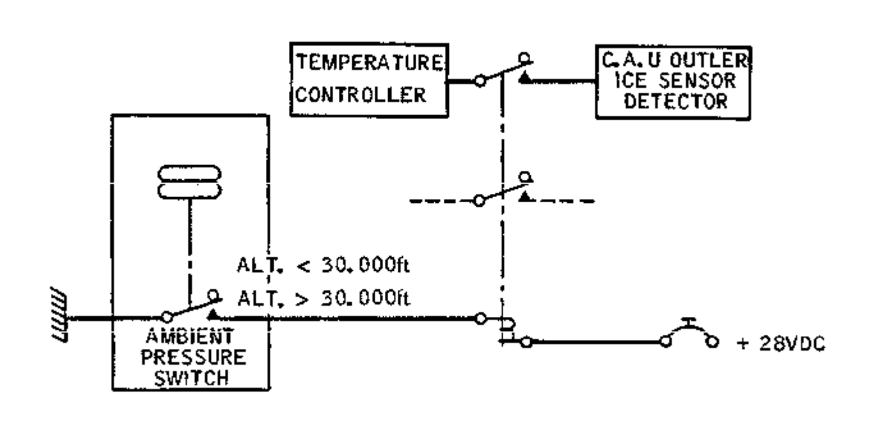
The ambient pressure switch is located in bay between frames 10 and 11 and is accessible through door 123AB.
This pressure switch consists of a body incorporating a microswitch operated by an aneroid sensitive to ambient pressure.
The body is fitted with an electrical plug and an ambient temperature port.

B. Operation

When aircraft altitude increases, the ambient pressure detected by the pressure switch decreases, resulting in the expansion of the aneroid which, at 30,000 feet energizes microswitch contact.
When aircraft altitude decreases, the aneroid contracts at 30,000 feet thus cutting microswitch contact.
One of the actions of the pressure switch is to switch over the ice sensor transducer to the temperature controller for an altitude above 30,000 feet.



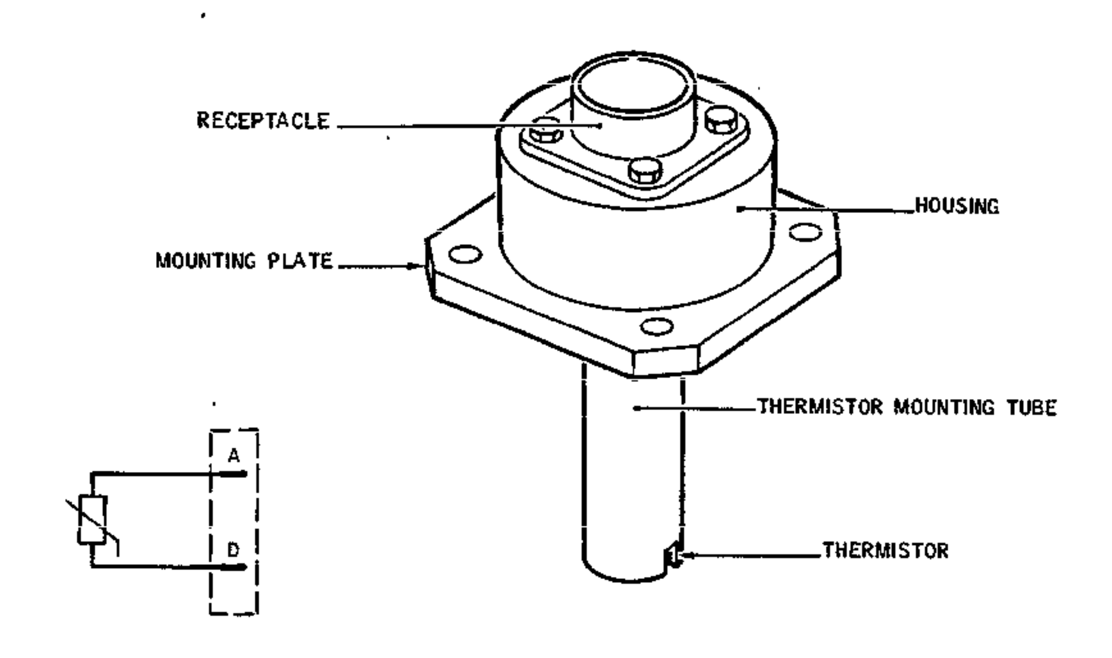




CMA 21 61 00 0 AWM0

Ambient Pressure Switch
Figure 011

10. Sensor - Temperature (Ref. Fig. 012)



CMA 21 61 00 0 AYMO

Temperature Sensor
Figure 012

Each air conditioning group is associated with four thermistor temperature sensors.
The flight compartment temperature control system includes :

- A semi-automatic temperature sensor H1064 which controls temperature in manual mode (temperature selector in STANDBY position), located in duct in wing.
- A wing mini-maxi temperature sensor H1048 located in duct in wing
- A fuselage mini-maxi temperature sensor H1040 located in duct downstream of the distribution chamber.
- An ambient temperature sensor H1044 located in flight compartment

These three last sensors are used in automatic mode.

A. Description

The sensor assembly consists of a thermistor housed at

the end of a fiberglass tube. The thermistor electrical wire passes through the tube to an electrical connector.

B. Operation

With a sensor plunged in the air stream, any variation in temperature of the conditioning air results in the same variation of the sensor resistance.

11. Indicator - Ambient Temperature (Ref. Fig. 013)

The ambient temperature indicator 1D163 located on Flight Engineer's panel 2-214 in flight compartment reads the ambient temperature in flight compartment.

A. Description

The indicator consists of :

- A dial on the front face graduated from - 10°C to + 60°C
- An electrical connector at the rear
- A measuring circuit which controls the pointer moving over the graduated dial
- An integral lighting circuit

B. Operation

The ambient temperature indicator operates in conjunction with the ambient temperature sensor. The signal from the sensor causes a desequilibrium in Wheatstone bridge, thus resulting in a current supplying a galvanometer associated with the indicating pointer.

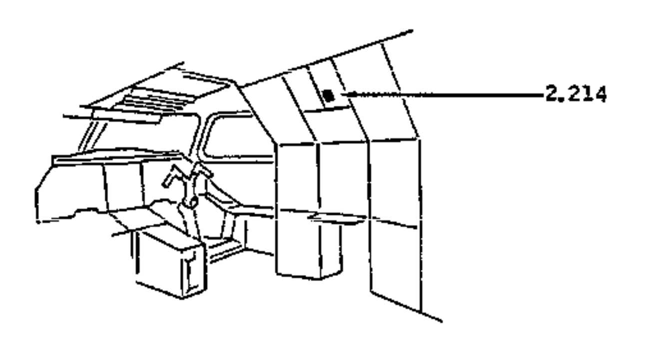
12. Indicator - Dual Air Conditioning Temperature (Ref. Fig. 014)

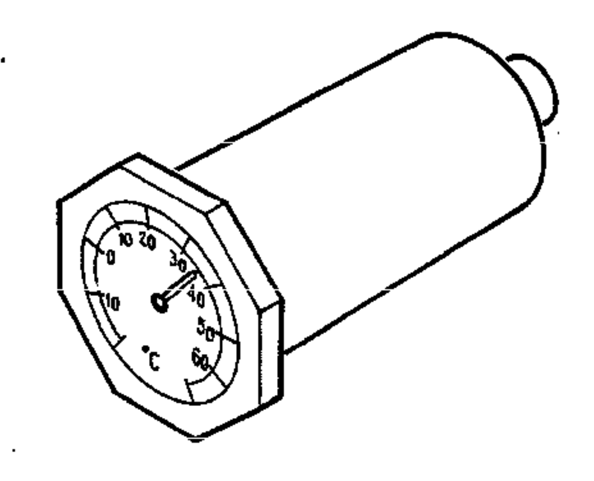
The dual air conditioning temperature indicator 1D164, located on Flight Engineer's panel 2-214 gives the temperature of the conditioning air at cold air unit inlet and outlet.

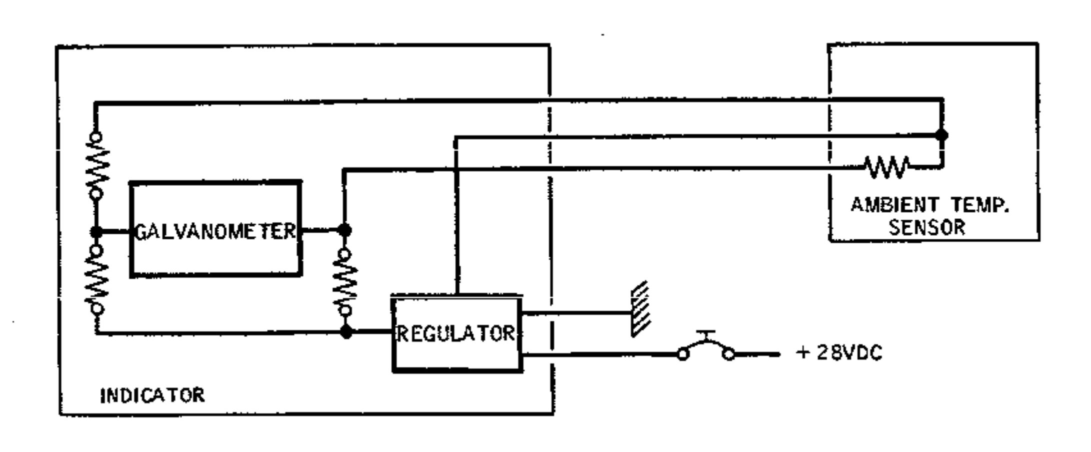
A. Description

The indicator consists of :

- A dual dial on the front face
  The upper graduations, from 50 to 200°C correspond to cold air unit outlet temperature (sensor 1D167)
  The lower graduations from - 50 to + 100°C correspond to cold air unit outlet temperature (sensor 1D166)
- An electrical connector
- Two electronic modules, each controlling a motor connected

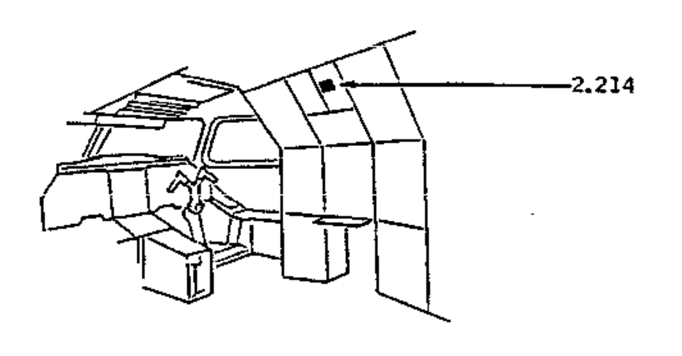


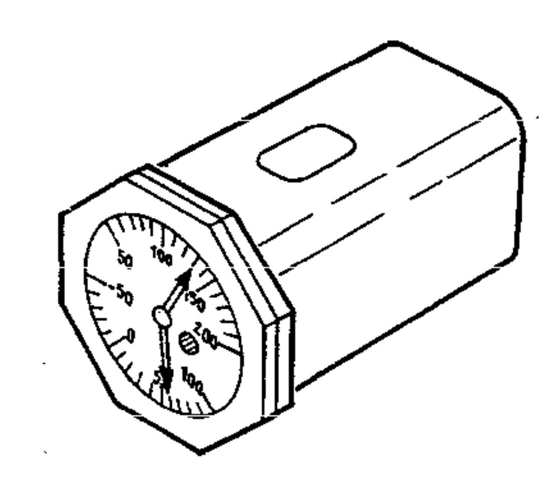


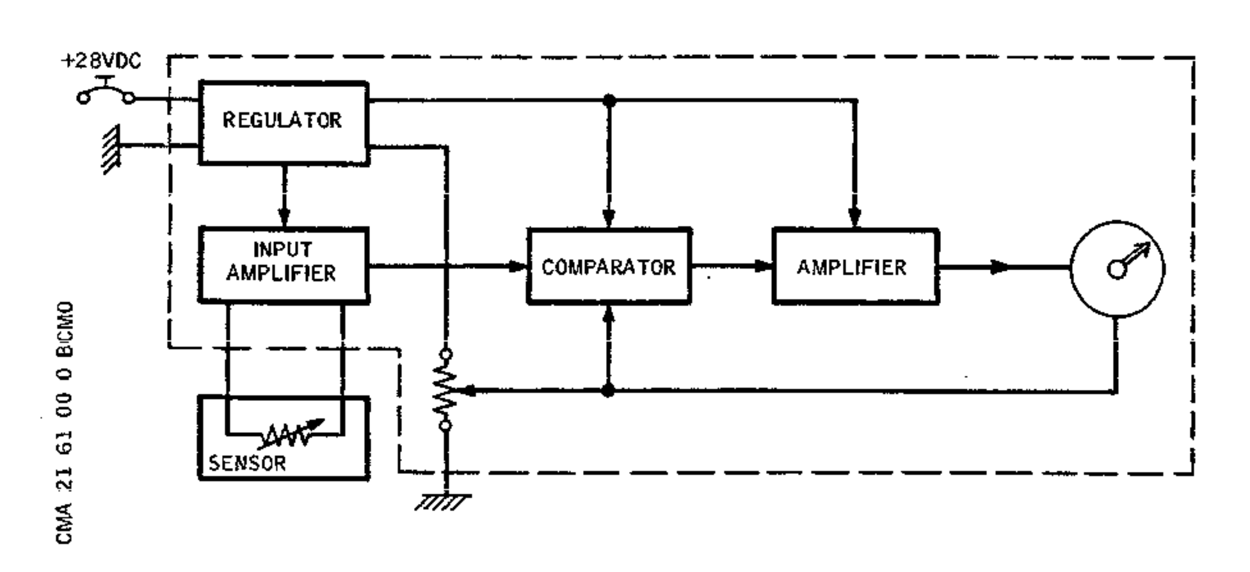


CMA 21 61 00 0 BAM0

Ambient Temperature Indicator
Figure 013







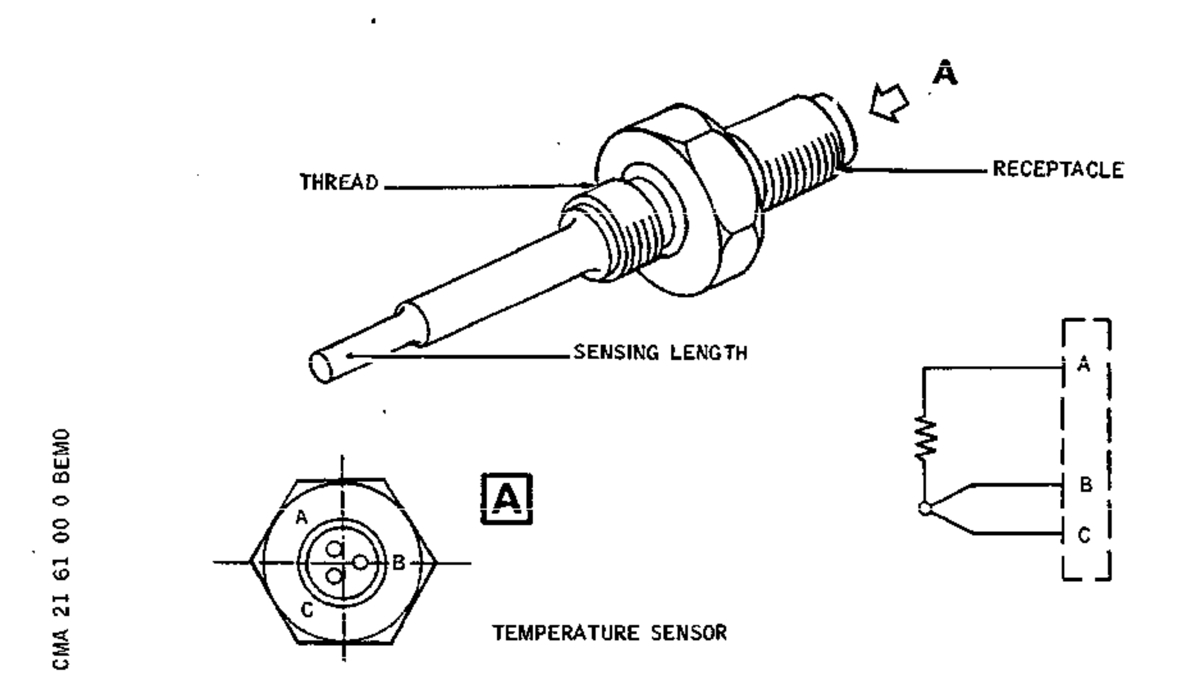
Dual Air Conditioning Temperature Indicator
Figure 014

to a pointer
- An electrical supply to indicator (flag) on the dial.
- An integral lighting circuit

B. Operation

The dual air conditioning temperature indicator comprises two identical channels each composed of an electronic and mechanical part.
Each channel is fed electrically from an ambient temperature sensor in a duct, and the voltage signal is compared with the voltage from the feedback circuit.
The resulting error voltage causes a motor to rotate until the voltages are balanced. The motor is fitted with an indicating pointer.
The supply circuit is common to both channels.
If the power supply is cut off to the indicator a cross-hatched flag appears at the RH side of the dial.

13. Sensors - Temperature (Ref. Fig. 015)



Temperature Sensor
Figure 015

The flight compartment temperature control system includes three identical temperature sensors :

- Sensor 1D165 located in flight compartment which transmits temperature information to indicator 1D163.
- Sensor 1D166 at boostrap inlet which transmit temperature information to indicator 1D164.

A. Description

The sensor assembly consists of a platinum resistance contained in a stainless steel tube. The tube is attached to a body on which is screwed the sensor support plate and an electrical connector.

B. Operation

With a sensor located in the air stream, any variation in temperature of the conditioning air results in the same variation of the sensor resistance.

14. Fan - Sampling Duct (Ref. Fig. 016)

The sampling duct fan H1028 cools the compartment where ambient temperature sensors H1044 and 1D165, the role of which is to measure flight compartment temperature, are located.
The fan is installed behind panel 211NS.

A. Description

The sampling duct fan consists mainly of :

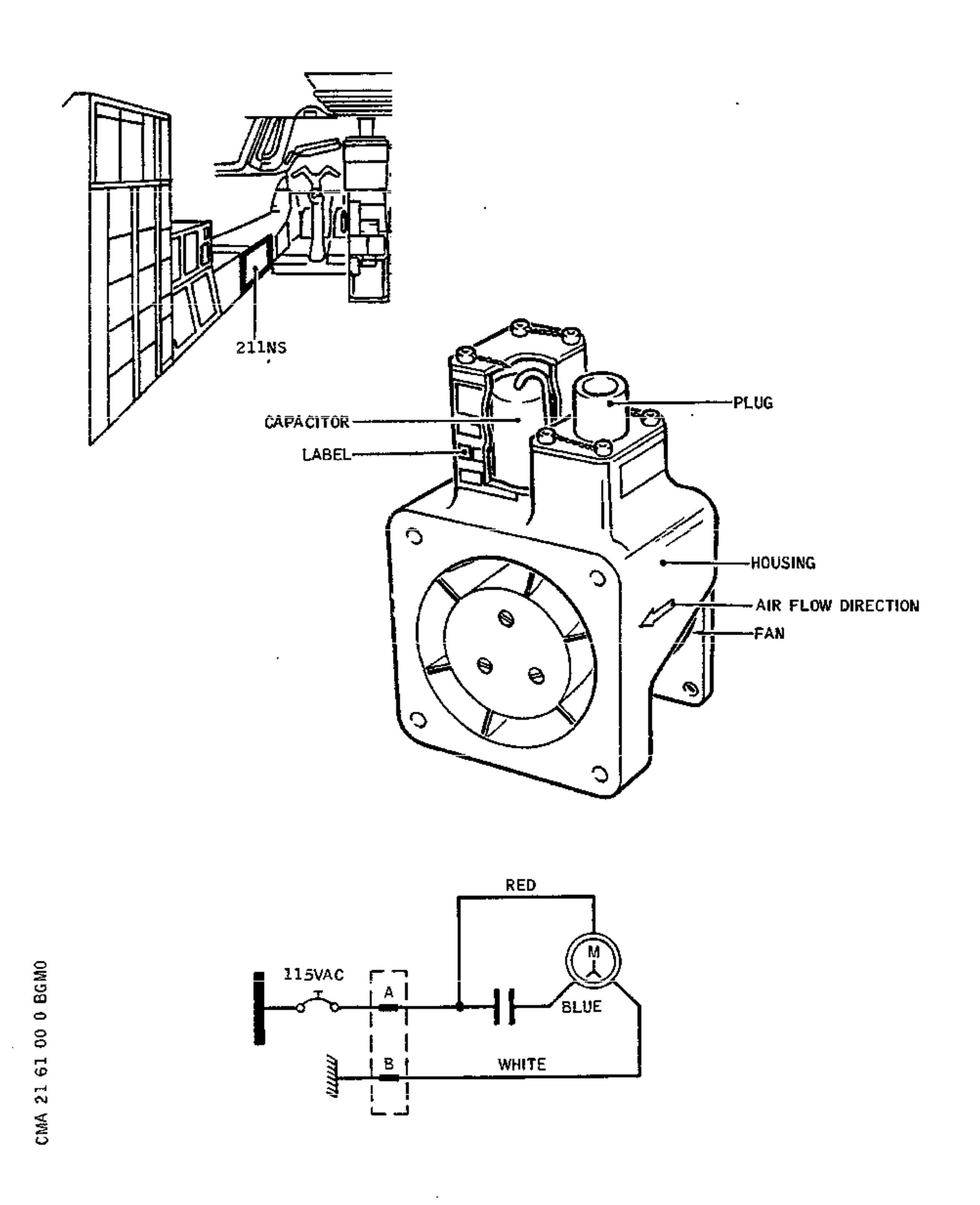
- An aluminium alloy casing
- A six-blade rotor cage type induction motor with stator attached to casing
- An electrical connector

The direction of air flow is shown by an arrow on the casing.

B. Operation

As soon as the aircraft electrical network is energized, the fan is supplied with power. The current is directly fed to the motor windings (red and white wires).
The supply to the winding (blue wire) passes through a capacitance which induces a phase shift between the motor currents, generating a magnetic field causing the rotor to turn.

15. Operation



Sampling Duct Fan
Figure 016

A. Normal Operation (Automatic Mode) (Ref. Fig. 017)

Normal operation of the flight compartment temperature control system is automatic. Under normal conditions, the conditioning air is bled from group 1.
With the temperature selector placed in any position of the AUTO range, wafer A switches 115 volts, 400 Hz supply to the temperature controller and wafer B switches resistors in relation to the desired temperature. The resulting signal is compared with the signal sent by the temperature sensor H1044 and any difference is amplified via amplifier A1 of the temperature controller.
The signal is modified in the temperature controller by the signals received from :

- Either the fuselage mini-maxi temperature sensor
- Or from the wing mini-maxi temperature sensor

The error signal amplified by amplifier A2 inside the temperature controller is sent to the T.C.V. automatic control motor until the variation between the temperature desired and the actual temperature is reduced to zero.

Ambient pressure switch H1032 controls relay 1H910 which ensures :

- Below 30,000 feet, a temperature of the mixed air between + 5°C and + 80°C.
- Above 30,000 feet, a temperature of the mixed air between - 30°C and + 80°C.
- If the mixing duct presents signs of icing a signal is sent to amplifier A51 until ice has disappeared.

B. Manual Operation (STANDBY mode) (Ref. Fig. 018)

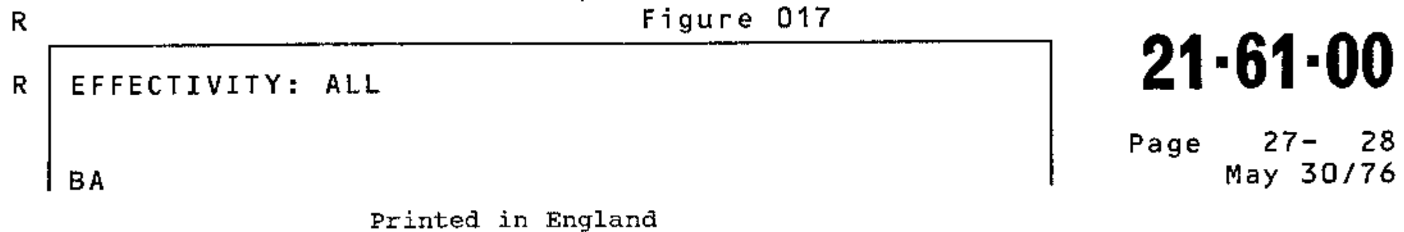
If the automatic temperature control system fails, temperature control can be performed manually (STANDBY mode). The temperature selector must be placed in any position of the STANDBY range.
This action causes :

- Cutting of the circuit supplying temperature controller with 115 V, 400 Hz power
- Switching of the + 28 V current to the STANDBY circuit of the temperature selector
- Switching of a resistance of the selector at the input of amplifier A1.
- Activation of temperature sensor H1064.

Any difference between the mixed air temperature desired and the actual temperature in the duct (semi-automatic

LETTERS IN A CIRCLE INDICATE TEST POINTS

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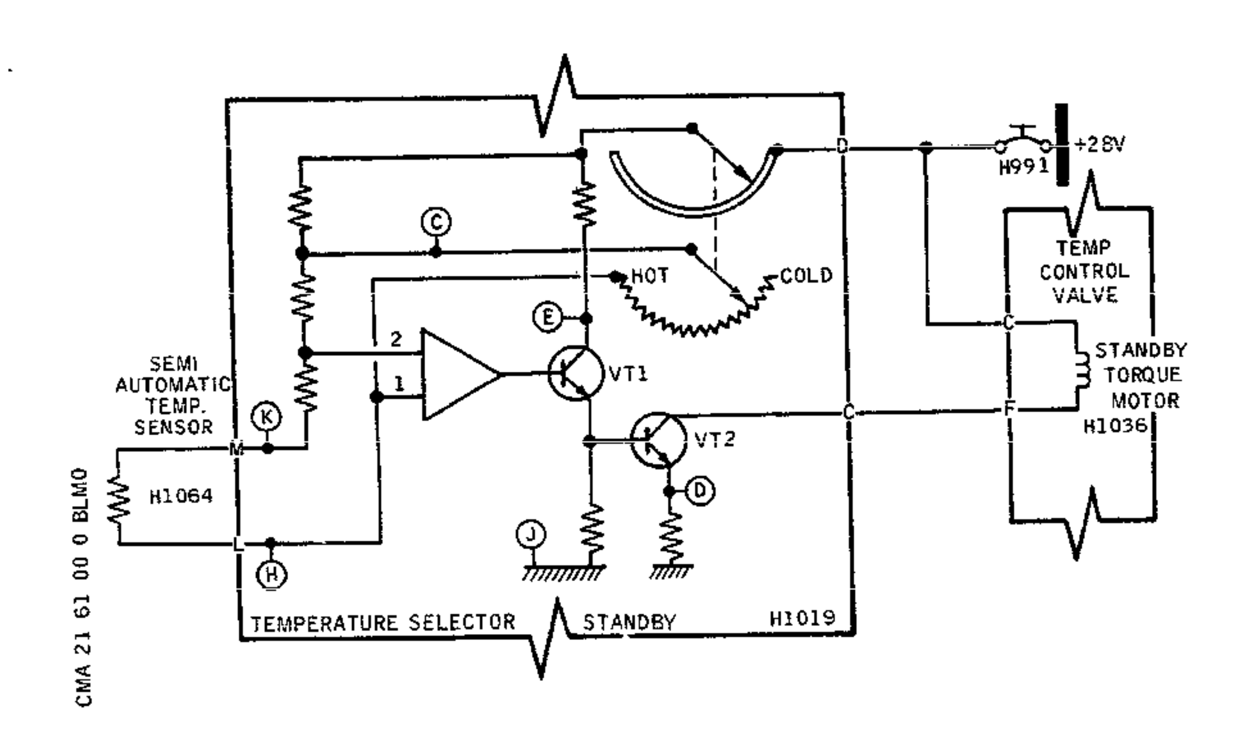


Flight Compartment Temperature Control -
Operation in AUTO Mode
Figure 017

R
R EFFECTIVITY: ALL

BA

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Flight Compartment Temperature Control -
Operation in STANDBY Mode
Figure 018

temperature sensor H1064) produces a difference of potential at amplifier A1 input.
The output signal unlocks transistor A2. The temperature control valve is then activated by its manual control motor (operation in STANDBY mode) until the temperature variation is reduced to zero.

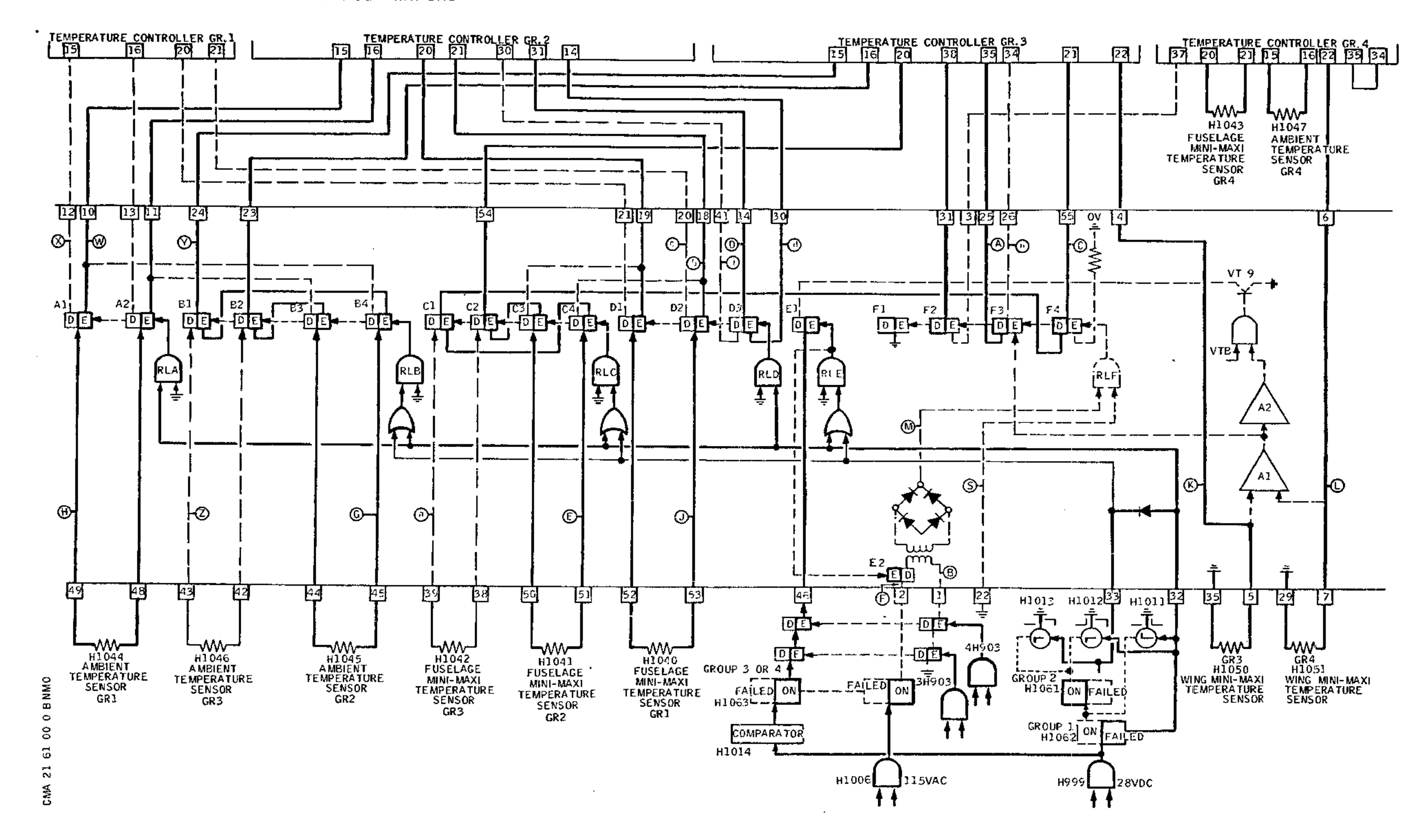
C. Failure of Air Conditioning Group 1 (Ref. Fig.019 and 020)

(1) Operation

In the event of failure of the flight compartment temperature control system due to a faulty component between the temperature control valve and the passenger cabin inlet safety valve, there is no possibility of bleeding air from engine 2 through the crossbleed valve. In which case, group 1 is thus unserviceable. On panel 2-214, it is necessary therefore to :

- Place BLEED VALVES ENG1 switch in SHUT position, and COND VALVE ENG1 switch in OFF position

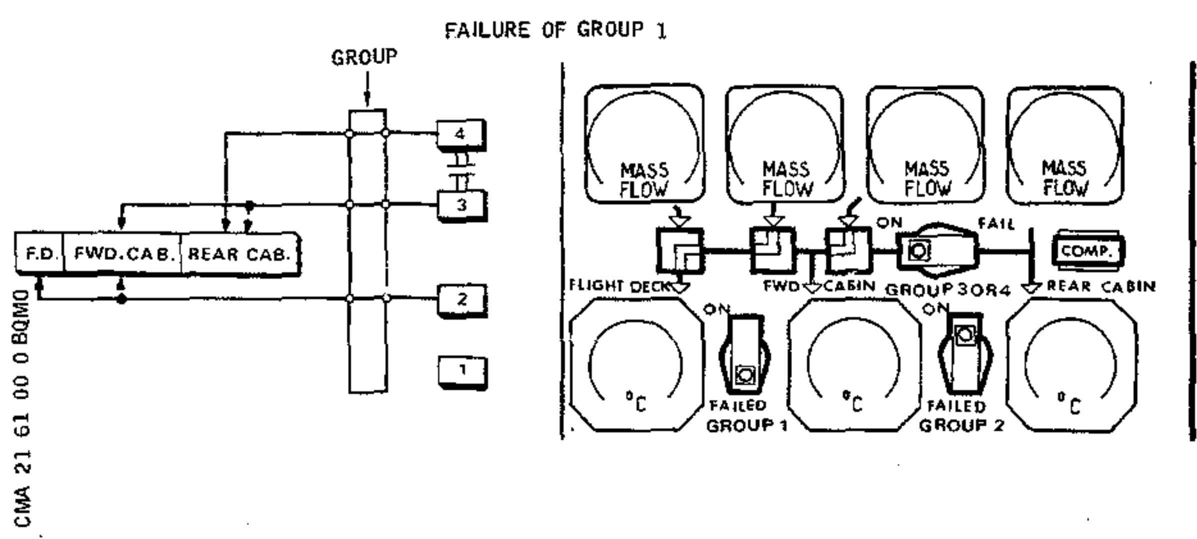
INTENTIONALLY BLANK



Group 1 Failure - Switching
Figure 019

NORMAL OPERATION

GROUP
4
3
2
1
F.D.
FWD.CAB.
REAR CAB.
MASS FLOW
MASS FLOW
MASS FLOW
MASS FLOW
FLIGHT DECK
FWD
CABIN
ON
FAIL
GROUP 3 OR 4
REAR CABIN
ON
°C
FAILED
GROUP 1
ON
°C
FAILED
GROUP 2
°C



Indicating System
Figure 020

- To place group 1 temperature selector in COLD position
- To place GROUP 1 switch in FAILED position
  This last action energizes relays inside the comparison unit, which :

- Switch off group 1 temperature controller
- Send signals from ambient temperature sensor H1044 and from fuselage mini-maxi temperature sensor H1040 of group 1 towards temperature controller of group 2.
- Dissociate the temperature control signals from groups 3 and 4.
- Send the signals from ambient temperature sensor H1045 and from fuselage mini-maxi temperature sensor H1041 of group 2 towards temperature controller of group 3.

The aircraft temperature control system which is normally assured as follows :

	Air Cond. from	Sensors	Temperature controller	Temperature selector
Flight Compartment	GR1	GR1	GR1	No.1(GR1)
FWD cabin	GR2	GR2	GR2	No.2(GR2)
AFT cabin	GR3 & 4	GR3 & 4	GR3 & 4	No.4(GR4)

becomes, after de-activation of group 1 :

	Air Cond. from	Sensors	Temperature controller	Temperature selector
Flight Compartment	GR2	GR1	GR2	No.2(GR2)
FWD cabin	GR3	GR2	GR3	No.3(GR3)
AFT cabin	GR4	GR44	GR4	No.4(GR4)

The flight compartment temperature control is then achieved by means of the temperature selector of group 2, and from engine 2 bleed.

(2) Indicating

The magnetic indicators on panel 2-214 display the various air flows according to whether the four groups operate normally, or flight compartment temperature control system is failed.

FLIGHT COMPARTMENT TEMPERATURE CONTROL - INSPECTION/CHECK

1. Sampling Duct Fan Screen

A. Inspection/Check

(1) Make certain that screen is clean; clean it if necessary.

(2) On panel 211NS, check that screen is clean and free from dust.

(3) If screen is clogged, clean it with a dry, clean and soft brush.

AMBIENT PRESSURE SWITCH - REMOVAL/INSTALLATION

1. General

The ambient pressure switches H1032 and H1034 are located between frames 10 and 11, and switches H1033 and 1035 are located between frames 15 and 16.

H1032 group 1 ambient pressure switch
H1033 group 2 ambient pressure switch
H1034 group 3 ambient pressure switch
H1035 group 4 ambient pressure switch

Removal/installation procedure is the same for each switch.

2. Ambient Pressure Switch

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform	
Circuit Breaker Safety Clips	

B. Prepare

(1) Position access platform.

(2) Open access doors :

123AB for ambient pressure switches H1032 and H1034.
123BB for ambient pressure switches H1033 and H1035.

(3) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1 GRP1 AIR GEN IND CONT & IND	1-213	1H 862	D13
Group 2 GRP2 AIR GEN IND CONT & IND	5-213	2H 862	F 9

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 3 GRP3 AIR GEN IND CONT & IND	15-215	3H 862	B 3
Group 4 GRP4 AIR GEN IND CONT & IND	15-216	4H 862	B23

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (4).

(2) Remove union (1).

(3) Remove screws (2).

(4) Remove ambient pressure switch (3).

D. Install

(1) Install ambient pressure switch (3); attach it with screws (2).

(2) Tighten union (1).

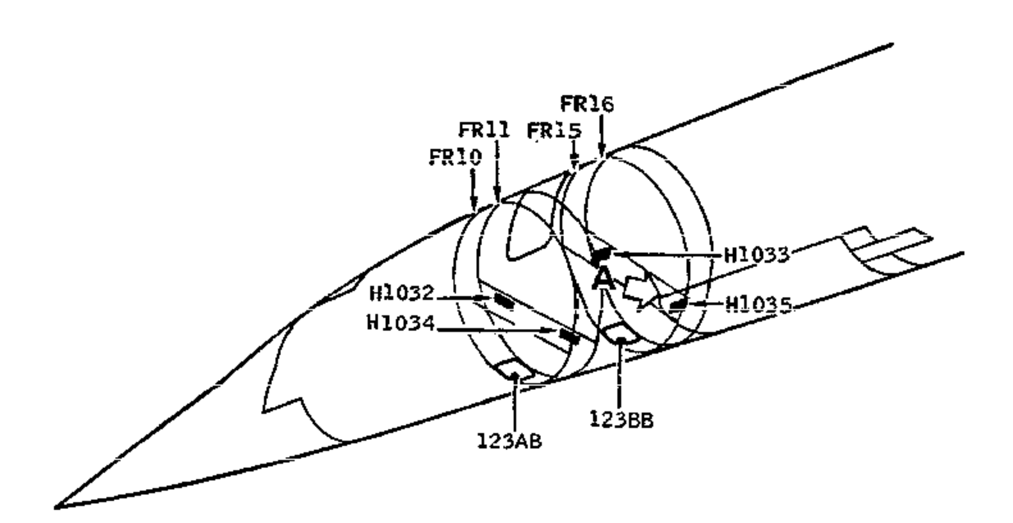
(3) Connect electrical connector (4).

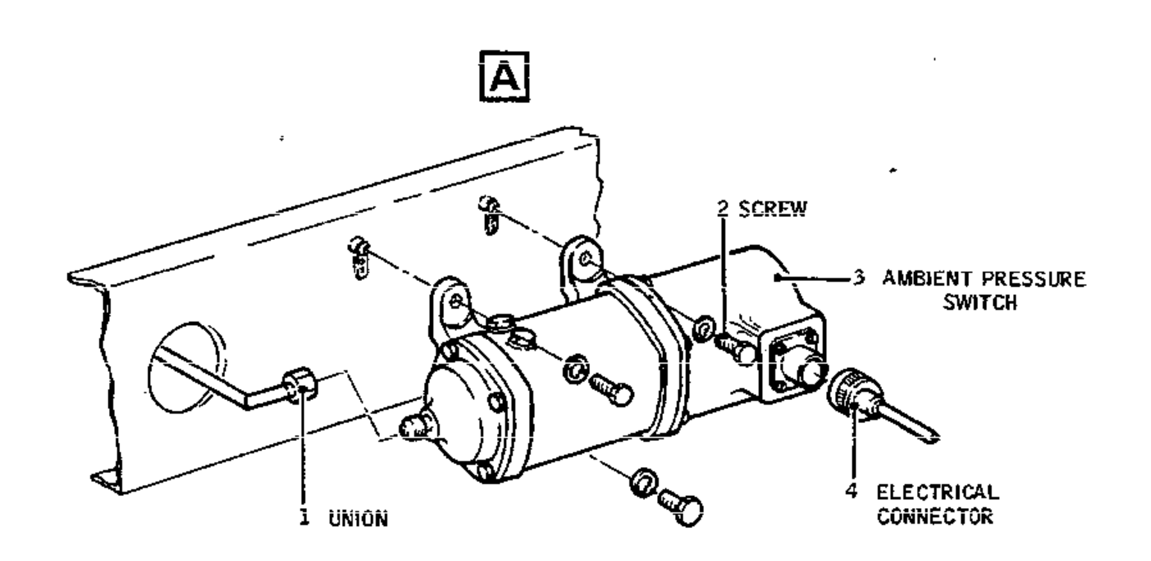
E. Close-Up

(1) Close access door.

(2) Remove access pplatform.

(3) Remove safety clips and tags and re-set the circuit breakers tripped in paragraph 2 B (3).





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Ambient Pressure Switch
Figure 401

AMBIENT PRESSURE SWITCH - ADJUSTMENT/TEST

1. General

The test for each ambient pressure switch is identical.
Group 1 ambient pressure switch H1032
Group 2 ambient pressure switch H1033
Group 3 ambient pressure switch H1034
Group 4 ambient pressure switch H1035

2. Operational Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Ground Depressurizing Unit Depressurizing Capability 280 m.bars (corresponding altitude: 31,556 ft. approx.)	
Electrical Ground Power Unit	
Adapter - Static Port	T8751E2.27.83002

B. Prepare

(1) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1 GRP1 AIR GEN CONT & IND	1-213	1H 862	D13
Group 2 GRP2 AIR GEN CONT & IND	5-213	2H 862	F 9
Group 3 GRP3 AIR GEN CONT & IND	15-215	3H 862	B43
Group 4 GRP4 AIR GEN CONT & IND	16-215	4H 862	B23

(2) Connect ground depressurizing unit to static ports

S11 S13 for ambient pressure switches H1032 and H1033
S08 S10 for ambient pressure switches H1034 and H1035

(3) Open door 151CB (access to water separator)

(4) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

C. Test

(1) Connect ground depressurizing unit to static port corresponding to ambient pressure switch to be tested.

(2) On ground depressurizing unit, select a negative pressure ranging between 328.44 and 297.25 mb or 28.078 ft and 30.275ft.

The O letter (OPEN) must appear in position indicating window located on water separator actuator casing.

(3) Return pressure to normal, the S letter (SHUT) must appear in position indicating window.

(4) Disconnect ground depressurizing unit.

D. Close-up

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit.

(2) Remove static port adapter.

(3) Close access door.

AMBIENT TEMPERATURE SENSOR - REMOVAL/INSTALLATION

1. General

   A. Ambient temperature sensor (1D165) is located in zone 211,
R   under the Captain's seat.

2. Ambient Temperature Sensor

   A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Electrical Ground Power Unit	
R Thermometer (Degrees centigrade)	
Corrosion resistant steel lockwire Dia. 0.020 in. (0.5mm)	

   B. Prepare

      (1) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 TEMP SELECTOR AUTO SUP & CONT	2-213	H1000	B17
FLT DECK TEMP IND	1-213	1D 161	E10
GRP2 SAMPLING DUCT FAN SUP	2-213	H1004	B16

      (2) Remove access panel 211GS.

   C. Remove (Ref. Fig. 401)

      (1) Remove electrical connectors (3), (4) and (7).

      (2) Remove screws (1).

(3) Remove sensor/sampling duct fan assembly (2).

(4) On this assembly :

(a) Remove lockwire and sensor (5).

(b) Discard seal (6).

D. Install

(1) On sensor/sampling duct fan assembly (2).

R (a) Screw sensor (5) fitted with a new seal (6).
R Wirelock sensor.

(2) Install sensor/sampling duct fan assembly (2).

(3) Install screws.

(4) Connect electrical connectors (3), (4) and (7).

E. Test

R (1) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2 B(1).

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(3) Place thermometer near ambient temperature sensor and note ambient temperature.

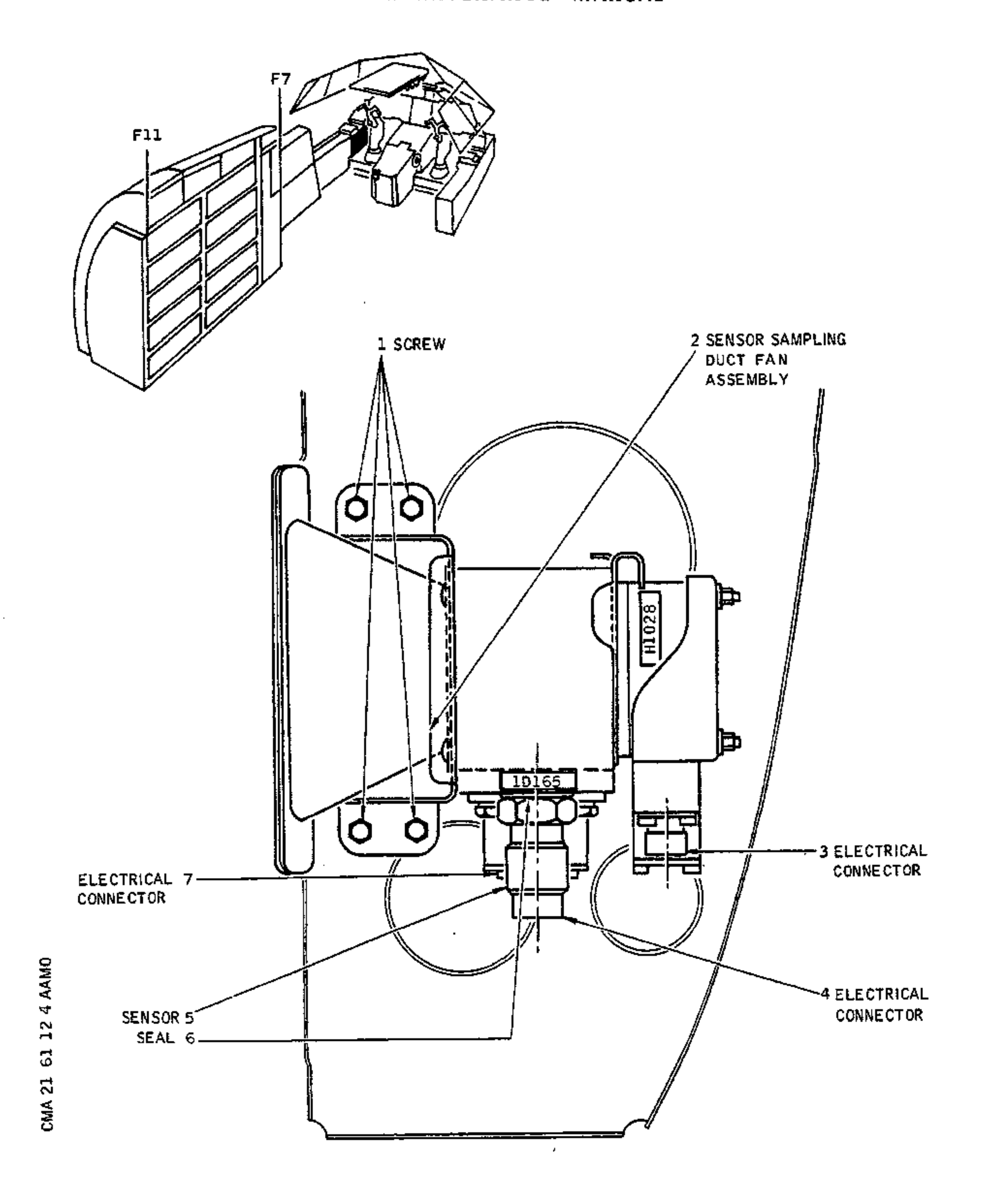
(4) On panel 2-214, make certain that temperature indicated by FLIGHT DECK temperature indicator corresponds to the temperature indicated by thermometer (± 3°).

G. Close-Up

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit.

(2) Install panel 21GS.

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Ambient Temperature Sensor
Figure 401

R

SAMPLING DUCT FAN - REMOVAL/INSTALLATION

1. General

Sampling duct fan H1028 is located in zone 211 under Captain's Seat.

2. Sampling Duct Fan

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Beaker Safety Clips	
Electrical Ground Power Unit	
Corrosion Resistant Steel Lockwire Dia. 0.023 in (0.8 mm)	

B. Prepare

(1) Trip Safety and tag the following circuit breakers.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 TEMP SELECTOR AUTO SUP & CONT	2-213	H1000	B17
FLT DECK TEMP IND	1-213	1D 161	E10
GRP1 SAMPLING DUCT FAN SUP	2-213	H1004	B16

(2) Remove panel 211 GS

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connectors (5), (6) and (7)

(2) Remove screws (1) and sampling duct fan/sensor assembly (2)

(3) On sampling duct fan/sensor assembly (2)

(a) Remove lockwire and nuts (3)

(b) Remove sampling duct fan (4)

D. Install

(1) On sampling duct fan/sensor assembly (2) :

(a) Install sampling duct fan (4).

NOTE: The arrow painted ou sampling duct fan must point in the airflow direction

(b) Install nuts (3); wirelock.

(2) Install sampling duct fan/sensor assembly (2)

(3) Connect electrical connectors (5), (6) and (7)

E. Test

(1) Connect electrical ground power unit and energize the aircraft electrical network (24-41-00, Servicing).

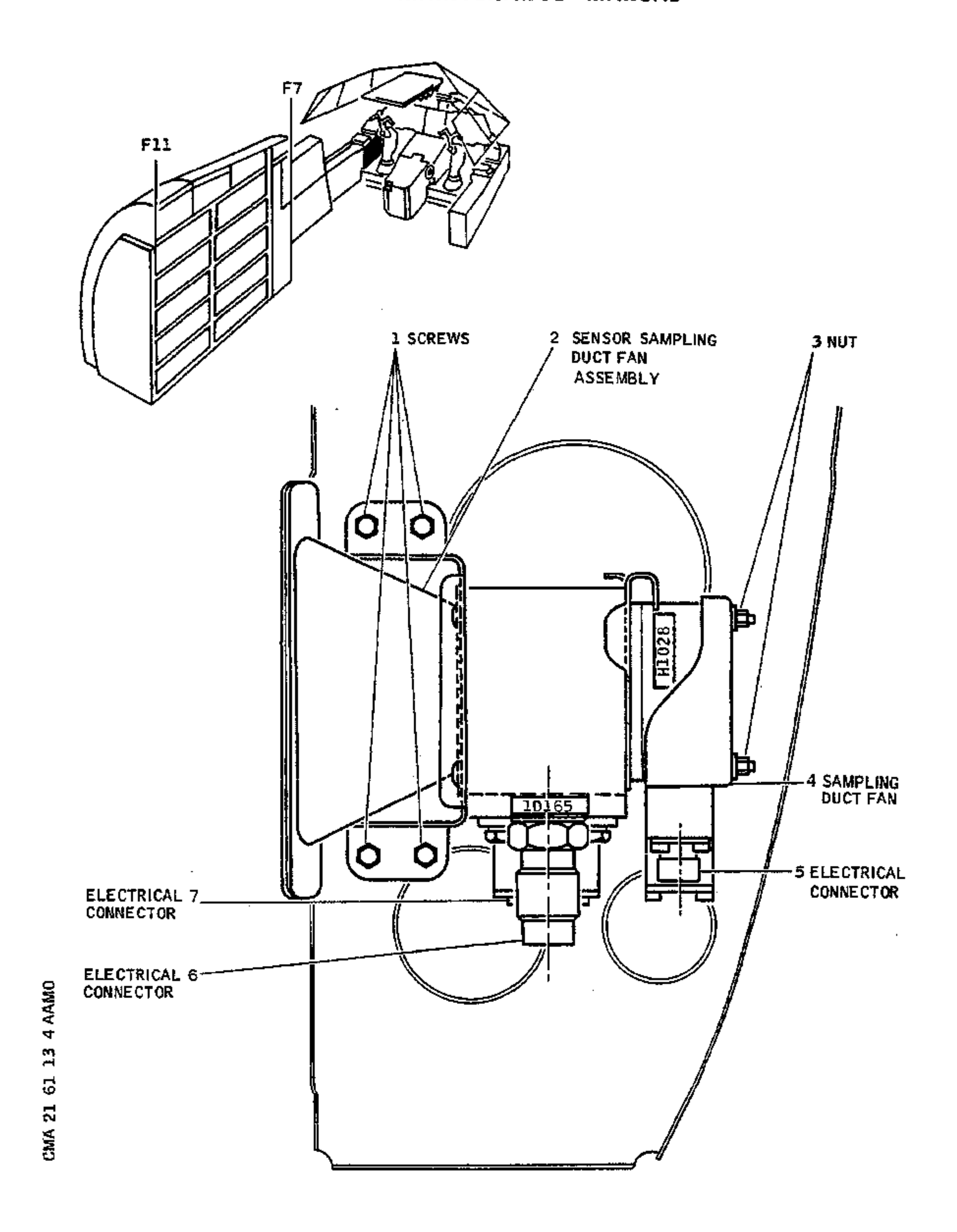
(2) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2 B. (1).

(3) Check that the airflows in the direction indicated by the FLOW arrow painted on sensor.

F. Close-Up

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit.

(2) Install panel 211 GS.



Sampling Duct Fan
Figure 401

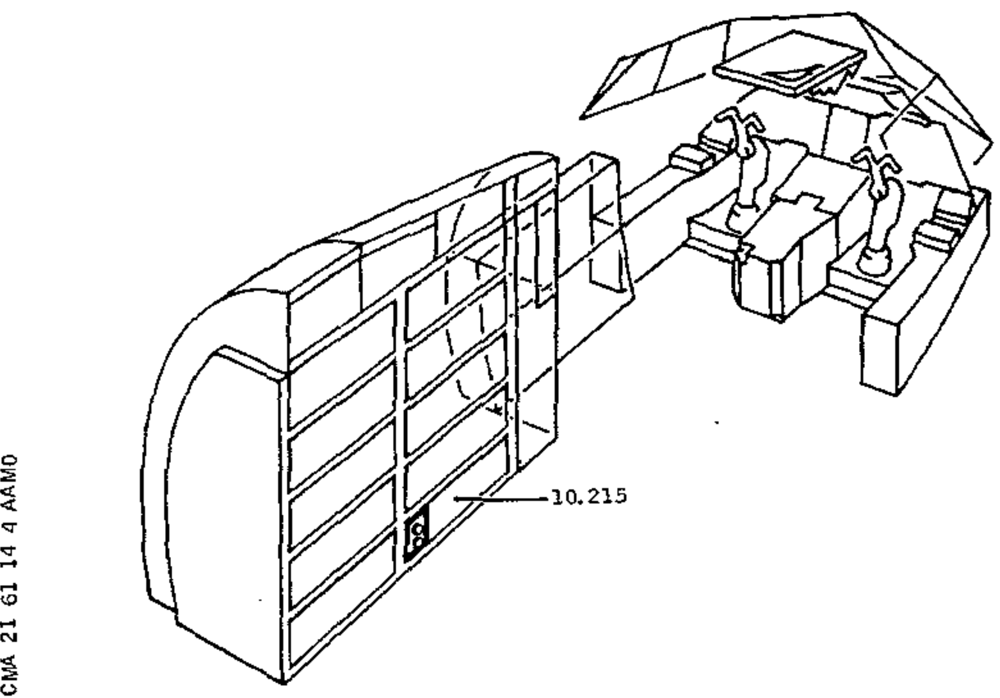
COMPARISON UNIT - REMOVAL/INSTALLATION

1. General

A. Removal/Installation for replacement

B. The comparison unit is located in LH electronics rack, in zone 215

2. Comparison Unit (Ref. Fig. 401)



Comparison Unit Location
Figure 401

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	

B. Prepare

(1) On LH electronicks rack, open panel 10-215

(2) Trip, safety and tag the following circuit breakers

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
TEMP COMPTR IND & GRP SELECT M1 SUP	5-213	H 999	B 9
GRPS 3 & 4 COMPTR CONT	4-213	H1006	C11

C. Remove

(1) Unscrew securing nut until it is out of the tab

(2) Move screw and nut assembly downwards

(3) Pull comparison unit hold it in order that it does not fall when it is out of the rack

D. Preparation of Replacement Component

(1) Make certain that electrical connector is in good condition (on rack side and on comparison unit side)

(2) Check that comparison unit is free from impact blows or traces of corrosion

E. Install

(1) Install comparison unit in its location

(2) Lift the screw and nut assembly and screw the latter in tab on forward face of comparison unit

(3) Tighten nut fully

F. Close Up

(1) Remove safety clips and tags and reset the following circuit breakers

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
TEMP COMPTR IND & GRP SELECT M1 SUP	5-213	H 999	B 9

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRPS 3 & 4 COMPTR CONT	4-213	H1006	C11

(2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment

(3) On LH electronics rack close panel 10-215

B G. Carry out Test of Group 3 and 4 Temperature Control (Groups
B 3 and 4 Slaved) - Reference 21-60-00 ADJUSTMENT/TEST.

AMBIENT TEMPERATURE INDICATOR - REMOVAL/INSTALLATION

1. General

Flight compartment ambient temperature indicator 1D163 is located on Flight Engineer panel 2-214.

2. Flight Compartment Ambient Temperature Indicator 1D163

A. Equipment and Materials

DESCRIPTION	PART NO.
Not Applicable	

B. Prepare

WARNING : AS A SAFETY MEASURE AND IN ORDER TO TAKE ALL NECESSARY PRECAUTIONS AGAINST INADVERTENT OPERATIONS, DISPLAY A WARNING NOTICE ON THE ELECTRICAL GROUND CONNECTOR PROHIBITING ENERGIZATION OF THE AIRCRAFT ELECTRICAL NETWORK.

(1) On EMERG GEN Flight Engineer panel 6-214, make certain that BATT A and BATT B switches are in OFF position.

WARNING : AS A SAFETY MEASURE AND IN ORDER TO TAKE ALL NECESSARY PRECAUTIONS AGAINST INADVERTENT OPERATIONS, DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF BATT A AND BATT B SWITCHES.

(2) At Flight Engineer station, open panel 2-214 (12 1/4 turn fasteners).

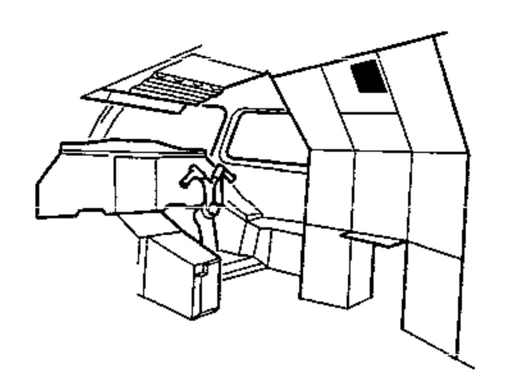
C. Remove

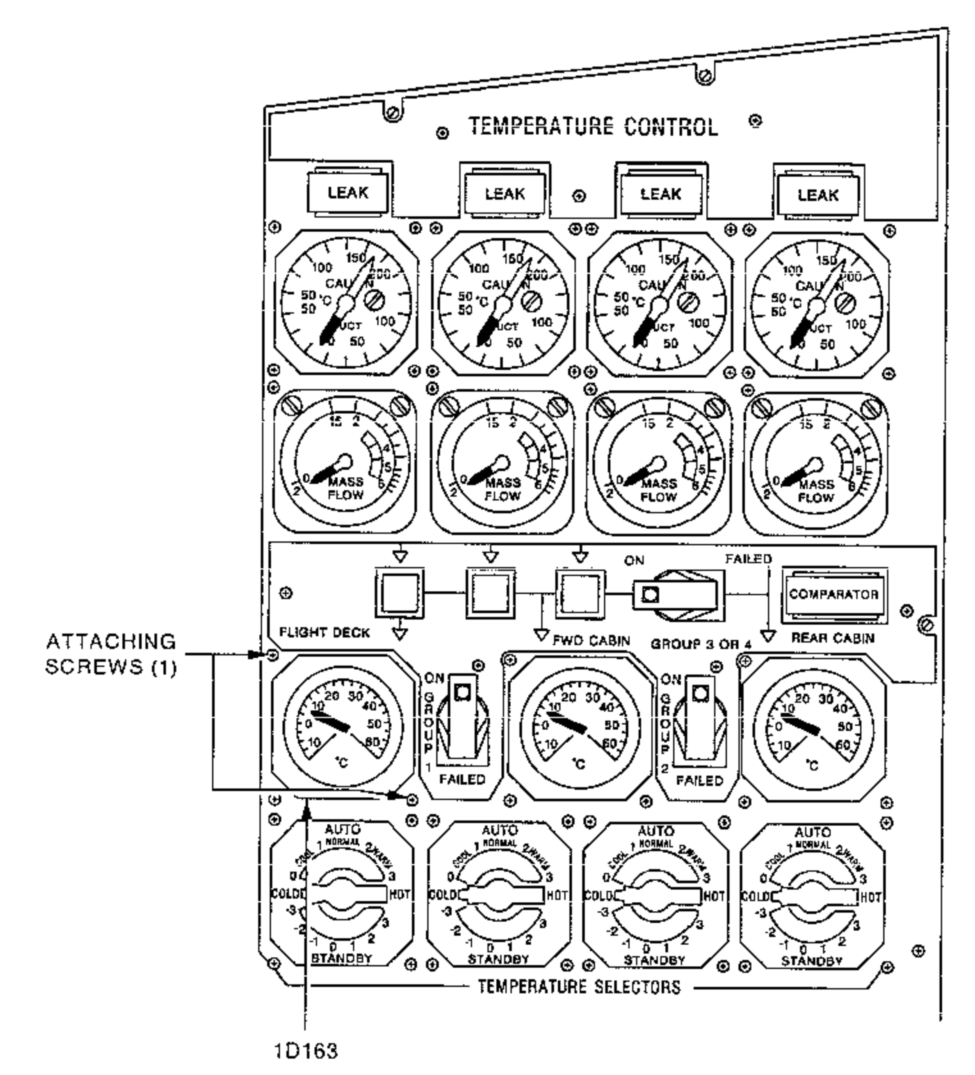
(1) At Flight Engineer station on TEMPERATURE CONTROL panel, disconnect connector (1D163A) from temperature indicator.

(2) Hold indicator with one hand and unscrew both attaching screws (1) (located on front face of panel).

(3) Remove the indicator.

D. Preparation of Replacement Component





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Location of Ambient Temperature Indicator (1D163)
Figure 401

(1) Make certain that the indicator shows no dents or scratched paint.

(2) Remove protective cap from electrical connector ; make certain that pins are neither distorted nor damaged.

E. Install

(1) Install indicator on panel (on front face) screw both attaching screws.

(2) Connect electrical connector (1D163A) to ambient temperature indicator 1D163.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(3) Close Flight Engineer panel 2-214 (12 screws, 1/4 turn).

B F. Test

B Check for correct operation by comparison with tempe-
B rature indicators of other groups.

G. Close-Up

(1) Remove warning notices from :

(a) Ground connector

(b) EMERG GEN panel.

AMBIENT TEMPERATURE INDICATOR - ADJUSTMENT/TEST

1. Functional Test of Ambient Temperature Indicator

A. General

The purpose of the test is to check that FLIGHT DECK ambient temperature indicator operates correctly.

B. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Decade Resistance Box	
Circuit Breaker Safety Clip	
1 Electrical Connector for Test	

C. Prepare (Ref. Fig. 501)

(1) Trip, safety and tag the following circuit breaker

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT DECK TEMP IND	1-213	1D 161	E10

(2) Gain access to ambient temperature sensor (Ref. 21-61-12, Page 401, R/I).

(3) Disconnect electrical connector from ambient temperature sensor (1D 165).

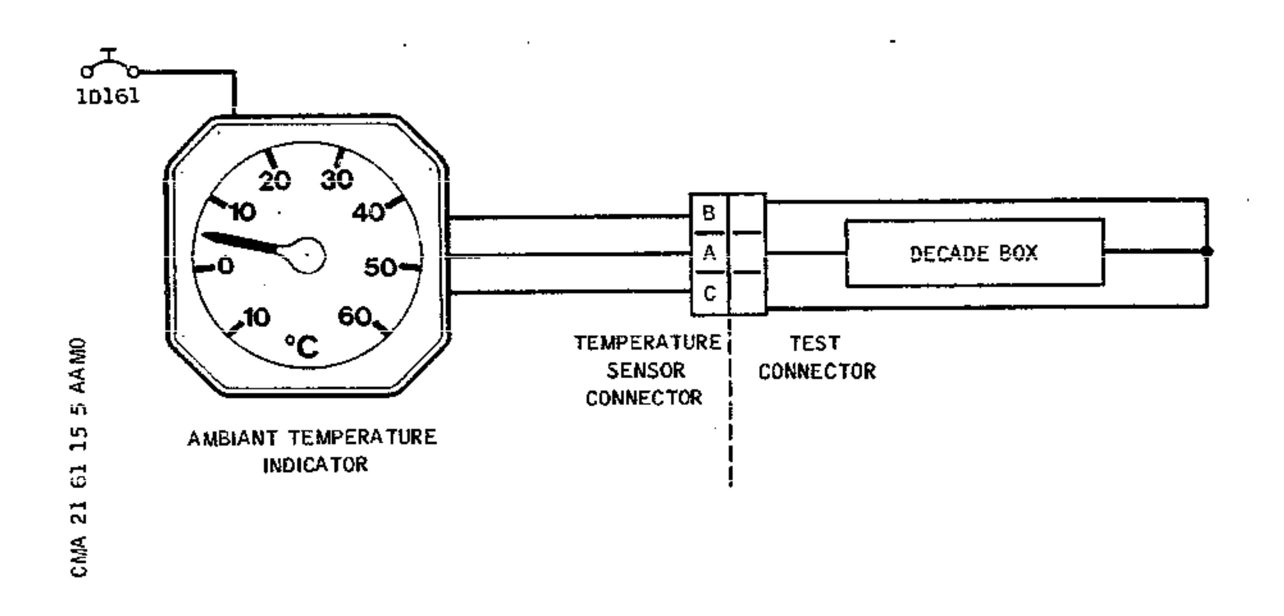
(4) Connect decade box to aircraft wiring according to the figure.

(5) Select a value of 124.85 ohms on decade resistance box.

(6) Set FLT DECK TEMP IND circuit breaker.

(7) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, S).

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Ambient Temperature Indicator Test
Figure 501

D. Test

(1) On decade box select resistance values according to table below and check that FLIGHT DECK ambient temperature indicator indicates the corresponding value.

TEMPERATURE °C	-10	0	10	20	30	40	50	60
Decade box resistance	124.85	130	135.13	140.25	145.35	150.44	155.51	160.56

NOTE : Tolerance on FLIGHT DECK temperature indicator is :
± 1.5°C in + 10°C to 30°C range.
± 3°C out of this range.

(2) Increase resistance value on resistance box until ambient temperature indicator pointer reaches maximum

stop.
Disconnect electrical wire between A terminal of test connector and decade boxes. Indicator pointer must remain on maximum stop.

(3) Trip the following circuit breaker

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT DECK TEMP IND	1-213	1D 161	E10

(4) Temperature indicator pointer must position below the first graduation.

E. Close-Up

(1) Disconnect test connector from ambient temperature sensor. Remove decade boxes.

(2) Reconnect ambient temperature sensor 1D 165 electrical connector.

(3) Install panel 211NS (Ref. 21-61-12, Page 401, R/I).

(4) Reset FLT DECK TEMP IND circuit breaker.

(5) De-energize the aircraft electrical network and disconnect electrical ground power unit.

DUAL AIR CONDITIONING TEMPERATURE INDICATOR REMOVAL/INSTALLATION

1. General

The dual air conditioning temperature indicator (1D164) is located on Flight Engineer panel 2-214.

2. Dual Air conditioning Temperature Indicator 1D164

A. Equipment and Materials

DESCRIPTION	PART NO.
Not Applicable	

B. Prepare

WARNING : AS A SAFETY MEASURE AND IN ORDER TO TAKE ALL NECESSARY PRECAUTIONS AGAINST INADVERTENT OPERATIONS, DISPLAY A WARNING NOTICE ON THE ELECTRICAL GROUND CONNECTOR PROHIBITING ENERGIZATION OF THE AIRCRAFT ELECTRICAL NETWORK.

(1) On EMERG GEN Flight Engineer panel 6-214, make certain that BATT A and BATT B switches are in OFF position.

WARNING : AS A SAFETY MEASURE AND IN ORDER TO TAKE ALL NECESSARY PRECAUTIONS AGAINST INADVERTENT OPERATIONS, DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF BATT A AND BATT B SWITCHES.

(2) Open Flight Engineer panel 2-214 (12 1/4 turn fasteners).

C. Remove

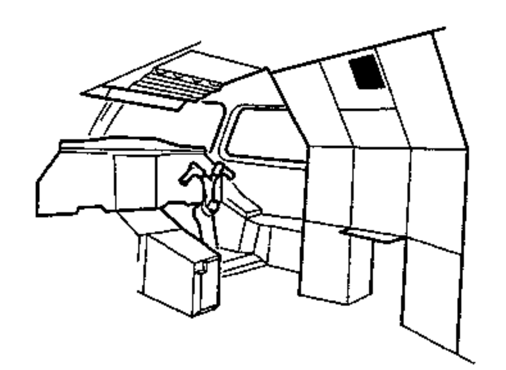
(1) On TEMPERATURE CONTROL panel 2-214, disconnect electrical connector 1D164A from indicator.

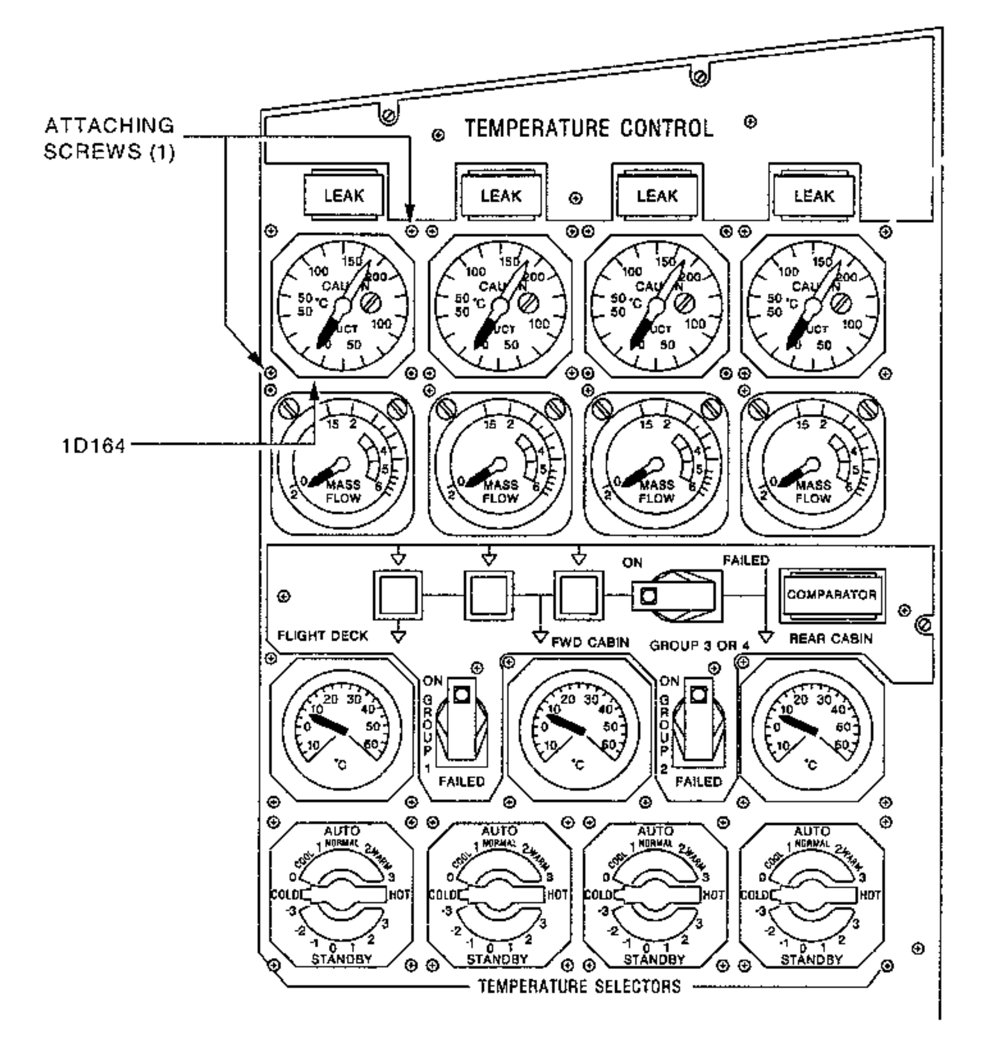
(2) Hold indicator with one hand ; unscrew both attaching nuts (1) (located on front face of panel).

(3) Remove indicator.

D. Preparation of Replacement Component

(1) Make certain that indicator shows no dents or scratch-





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Location of Dual Air Conditioning Temperature
Indicator 1D164
Figure 401

ed paint.

(2) Remove blanking cap from electrical connector and make certain that pins are neither distorted nor damaged.

E. Install

(1) Install indicator on panel (on front face). Screw both attaching screws.

(2) Connect electrical connector (1D164A) to indicator (1D164).

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(3) Close panel 2-214 (12 1/4 turn fasteners).

B F. Test

B Check for correct operation by comparison with tempe-
B rature indicators of other groups.

G. Close-Up

(1) Remove warning notices :

(a) From ground connector.

(b) From EMERG GEN panel.

DUAL AIR CONDITIONING TEMPERATURE INDICATOR - ADJUSTMENT/TEST

1. General

2. Test of Dual Air Conditioning Temperature Indicator

A. Equipment and Materials

DESCRIPTION	PART NO.
Ground Air Supply Unit : - Relative minimum pressure 2 bars, airflow 0.4 Kg/second - Relative maximum pressure 4.5 bars, airflow 0.6 Kg/second - Temperature must not exceed 300° C	
Electrical Ground Power Unit	
1 Decade Box	

B. Prepare

R (1) Connect electrical ground power unit (Ref. 24-41-00, S)
R and ground air supply unit.
R Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 CAU/DUCT TEMP IND	1-213	1D 162	E11
GRP2 CAU/DUCT TEMP IND	5-213	2D 162	D 9
GRP3 CAU/DUCT TEMP IND	15-215	3D 162	C 4
GRP4 CAU/DUCT TEMP IND	15-216	4D 162	C23

R
R (2) Open access doors.

GR	SENSORS	DOORS
1	1D 167 1D 166	532BT 542AT

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GR	SENSORS	DOORS
2	2D 167	531AT
	2D 166	542AT
3	3D 167	631AT
	3D 166	642AT
4	4D 167	632BT
	3D 166	642AT

C. Test

R Operational test of dual air conditioning temperature in-
R dicators.
R Two possibilities :

R (1) With engine running

On panel 2-214 :

	GR1	GR2	GR3	GR4
BLEED VALVE Switch OPEN	1H163	2H163	3H163	4H163
COND VALVE Switch OPEN	1H866	2H866	3H866	4H866

Check that temperature increases on dual air conditioning temperature indicator 1D164 (2D163, 3D164, 4D164) on CABIN portion as well as on DUCT portion.

R (2) By means of ground air supply unit

R (a) Connect ground air supply unit and pressurize the aircraft.
Check that BLEED VALVE switches are in OFF position.

R (b) Pressurize Fuel System

R WARNING : OBSERVE FUEL SYSTEM SAFETY PRECAUTIONS
R DESCRIBED IN 28-00-00 AND 28-10-00.

R NOTE : Pressurization assumes a minimum quantity
R of fuel of 2500 Kg in the appropriate fuel
R tank (1, 2, 3, 4).
R On centre console, place throttle control
R levers in SHUT position (lower mechanical
R stop).

Check that crossfeed valves are closed and that associated magnetic indicators display vertical stripes.
With the LP VALVE switch locked at OPEN by the switch guard, check that the associated magnetic indicator shows an in-line indication.
Place first of the three ENGINE FEED PUMPS control switches in ON position (MAIN PUMP)

Engine 1 Main Fuel Pump for group 1
Engine 2 Main Fuel Pump for group 2
Engine 3 Main Fuel Pump for group 3
Engine 4 Main Fuel Pump for group 4

Check that corresponding LOW PRESS indicator light goes off when pump operating pressure is reached.

WARNING : Fuel system must not operate more than 2 hours.

In case fuel system cannot be used :

Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
For GRP1 LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
For GRP2 LH UC WEIGHT SW B SYS SUP	3-213	G 293	B 8
For GRP3 RH UC WEIGHT SW B SYS SUP	3-213	G 294	B 9
For GRP4 RH UC WEIGHT SW A SYS SUP	1-213	G 295	M18

WARNING : During test, FUEL EXCH warning light may come on. On panel 2-214, place FUEL VALVE switch in OPEN position (self-

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holding cancellation).

(c) On panel 2-214, place CROSS BLEED switch 1H865 (2H865, 3H865, 4H865) in OPEN position. CROSS BLEED magnetic indicator 1H873 (2H873, 3H873, 4H873) displays a horizontal stripe.

(d) COND VALVE switch 1H866 (2H866, 3H866, 4H866) in ON position, COND VALVE magnetic indicator 1H874 (2H874, 3H874, 4H874) displays a vertical stripe.

(e) Check that temperature increases on air conditioning temperature indicator 1D164 (2D164, 3D164, 4D164) on "C.A.U IN" portion as well as on "DUCT" portion.

(f) After test, place CROSS BLEED and COND VALVE switches in OFF position.

(g) In case, the fuel system has been pressurized.

Place ENGINE FEED PUMP switch in OFF position. After a few seconds the corresponding LOW PRESS indicator light must come on.

If necessary, remove safety clip and tag and reset circuit breaker tripped in paragraph 2.C. (2)(b).

If FUEL EXCH warning has come on during test after switching off the ground air supply unit, wait for cancellation of warning and place FUEL VALVE switch in AUTO position.

(h) Stop pressurizing the aircraft and disconnect the ground air supply unit.

(3) Functional Test of Dual Air Conditioning Temperature Indicators (Ref. Fig. 501)

(a) CAU Inlet Duct Temperature

(a1) Connect electrical ground power unit and energize the aircraft electrical network.

(a2) On panel 1-213 (5-213, 15-215, 15-216), trip circuit breaker 1D162 (2D162, 3D162, 4D162).

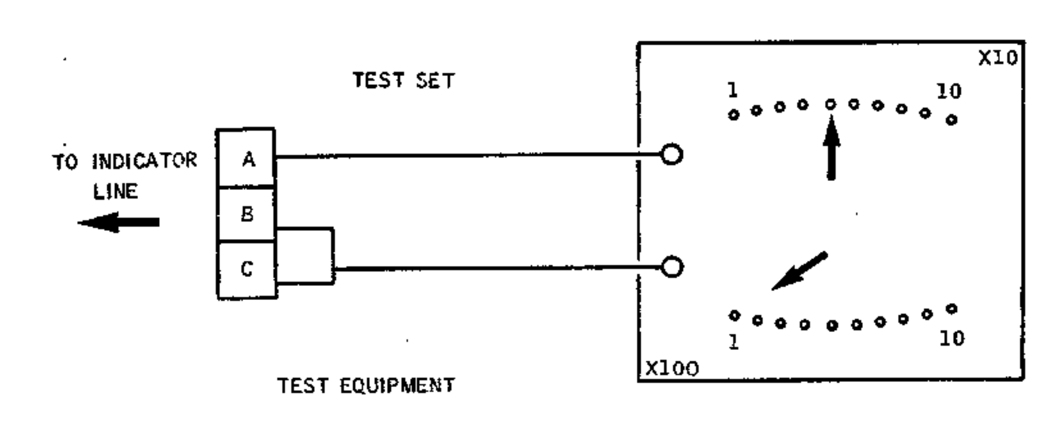
(a3) Open the appropriate doors among those quoted in paragraph 2. B. (2).

R (a4) In zone 534 (533, 633, 634) disconnect electrical connector 1D167A (2D167A, 3D167A, 4D167A) from CAU inlet temperature sensor 1D167 (2D167, 3D167, 4D167).

R (a5) In order not to damage the aircraft connector, connect a test connector to the latter ; shunt terminals C and B.
Connect two wires to test connector terminals A and C ; connect the wires to decade box and select a resistance of 170.6 ohms on the latter.

R (a6) On panel 1-213 (5-213, 15-215, 15-216) set circuit breakers 1D162 (2D162, 3D162, 4D162).

R (a7) On TEMPERATURE CONTROL panel, flag of CAU inlet duct temperature indicator 1D164 (2D164, 3D164, 4D164) must disappear and pointer on upper portion of CAU IN temperature indicator must position on graduation + 80 ± 5°C.



Test Equipment
Figure 501

R (a8) On test set, successively select resistances indicated on table below and check that CAU IN temperature indicator indicates the corresponding temperature values on upper portion of the dial.

R (a9) Remove the equipment connector.

SELECTED RESISTANCE Ω	CAU IN INDICATOR READING
170.6	80 ± 5°
205.4	150 ± 5°
239.4	220 - 5 + 0
170.6	80 ± 5

R (a10) In zone 534 (533, 633, 634) on corresponding temperature sensor 1 (2, 3, 4) D167 measure continuity between terminals B and C by means of an ohmeter.

R (a11) Check temperature sensor resistance by measuring the resistance between pins B or C and pin A. At ambient temperature the resistance should be 140 ohms approximately. For other temperatures, the resistance must correspond to the values given on table.

R (a12) Check resistance of insulating material surrounding sensing element ; measure resistance between either one of the pins and the sensor body by means of a megger/500 volts or a similar test device. The resistance of insulating material must be greater than 20 megohms.

R (a13) Connect connector 1D167A (2D167A, 3D167A, 4D167A) to corresponding sensor.

R (a14) Close the appropriate doors among those
R quoted in paragraph 2. B. (2).

De-energize the aircraft electrical network and disconnect electrical ground power unit.

TEMPERATURE °C	RESISTANCE ohms	TOLERANCES ± ohms	±°C	TEMPERATURE °C	RESISTANCE OHMS	TOLERANCES ± ohms	±°C
-100	77.740	0.30	0.60	160	210.289		
- 90	83.057			170	215.179		
- 80	88.351			180	220.053		
- 70	93.622			190	224.912		
- 60	98.873			200	229.756	0.50	1.00
- 50	104.104			210	234.585		
- 40	109.304			220	239.399		
- 30	114.512			230	244.197		
- 20	119.691			240	248.981		
- 10	124.853			250	253.749		
0	130.000	0.13	0.25	260	258.502		
10	135.131			270	263.240		
20	140.248			280	267.963		
30	145.349			290	272.670		
40	150.436			300	277.363	0.80	1.60
50	155.507			310	282.040		
60	160.563			320	286.703		
70	165.603			330	291.350		

TEMPERATURE °C	RESISTANCE ohms	TOLERANCES ± ohms	±°C	TEMPERATURE °C	RESISTANCE OHMS	TOLERANCES ± ohms	±°C
80	170.629			340	295.982		
90	175.639			350	300.599		
100	180.635			360	305.201		
110	185.615			370	309.787		
120	190.580			380	314.358		
130	195.530			390	318.915		
140	200.465			400	323.456	1.10	2.20
150	205.385						

(b) CAU Outlet Duct Temperature (DUCT)

Connect electrical ground power unit and energize the aircraft electrical network.

- On panel 1-213 (5-213, 15-215, 15-216) trip circuit breaker 1D162 (2D162, 3D162, 4D162).
- Open the appropriate doors among those quoted in paragraph 2. B. (2). R
- In zone 535 (542, 642, 635), disconnect electrical connector 1D166A (2D166A, 3D166A, 4D166A) from CAU outlet temperature sensor 1D166 (2D166, 3D166, 4D166).
- In order not to damage the aircraft connector, connect a test connector to the latter ; shunt terminals C and B. Connect two wires to test connector terminals A and C ; connect the wires to decade box and select a resistance of 104.1 ohms on the latter. Refer to the test equipment already mentioned.

On panel 1-213 (5-213, 15-213, 15-216) set circuit breaker 1D162 (2D162, 3D162, 4D162).
On panel 2-214 flag of DUCT CAU outlet temperature indicator 1D164 (2D164, 3D164, 4D164) must desappear and pointer on DUCT portion of indicator must position on $50 {}^{+5°C}_{-0}$ graduation.

On decade box, successively select the resistances indicated in the table below and check that temperature indicator gives the corresponding values.

RESISTANCE SELECTED Ω	INDICATOR READING DUCT °C
104.1	- 50 - 0 / + 5
130	0 ± 5
R 190.6	+ 120 + 0 / - 5 (R)
R 104.1	- 50 - 0 / + 5

Remove test connector.

In zone 535 (542, 642, 635) on corresponding temperature sensor 1 (2, 3, 4) D166 measure continuity between terminals B and C by means of an ohmeter.

- Check temperature sensor resistance by measuring resistance between pins B and C and pin A. At ambient temperature the resistance should be 140 ohms approximately.
  For other temperatures, the resistance must correspond to the values given in table above.
  Check resistance of insulating material surrounding sensing element ; measure resistance between either one of the pins and the sensor body by means of a megger/500 volts or a similar test device. The resistance of insulating material must be greater than 20 megohms.
- Connect connector 1D166A (2D166A, 3D166A, 4D166A) to sensor 1D166 (2D166, 3D166, 4D166).

R D. Close-Up

- Close the appropriate wing access doors among
  R those quoted in paragraph 2. B. (2).
- De-energize the aircraft electrical network and disconnect electrical ground power unit.

1. General

The temperature control valve position indicators H1015, H1016, H1017 and H1018 are installed on Flight Engineer's panel 2-214 They are identical, thus the removal/installation procedure is identical for each of them.

2. Temperature Control Valve Position Indicator (Ref. Fig. 401)

A. Equipment and Materials

DESCRIPTION	PART NO.
Not applicable	

B. Prepare

CAUTION : DE-ENERGIZE THE AIRCRAFT ELECTRICAL NETWORK (REF. 24-41-00, SERVICING).

C. Remove (Ref. Fig. 401)

(1) Loosen securing screws (1) several turns.

(2) Remove the temperature control valve position indicator from the panel, and disconnect electrical connector (2) located behind the indicator.

(3) Remove the indicator (3).

D. Preparation of Replacement Component

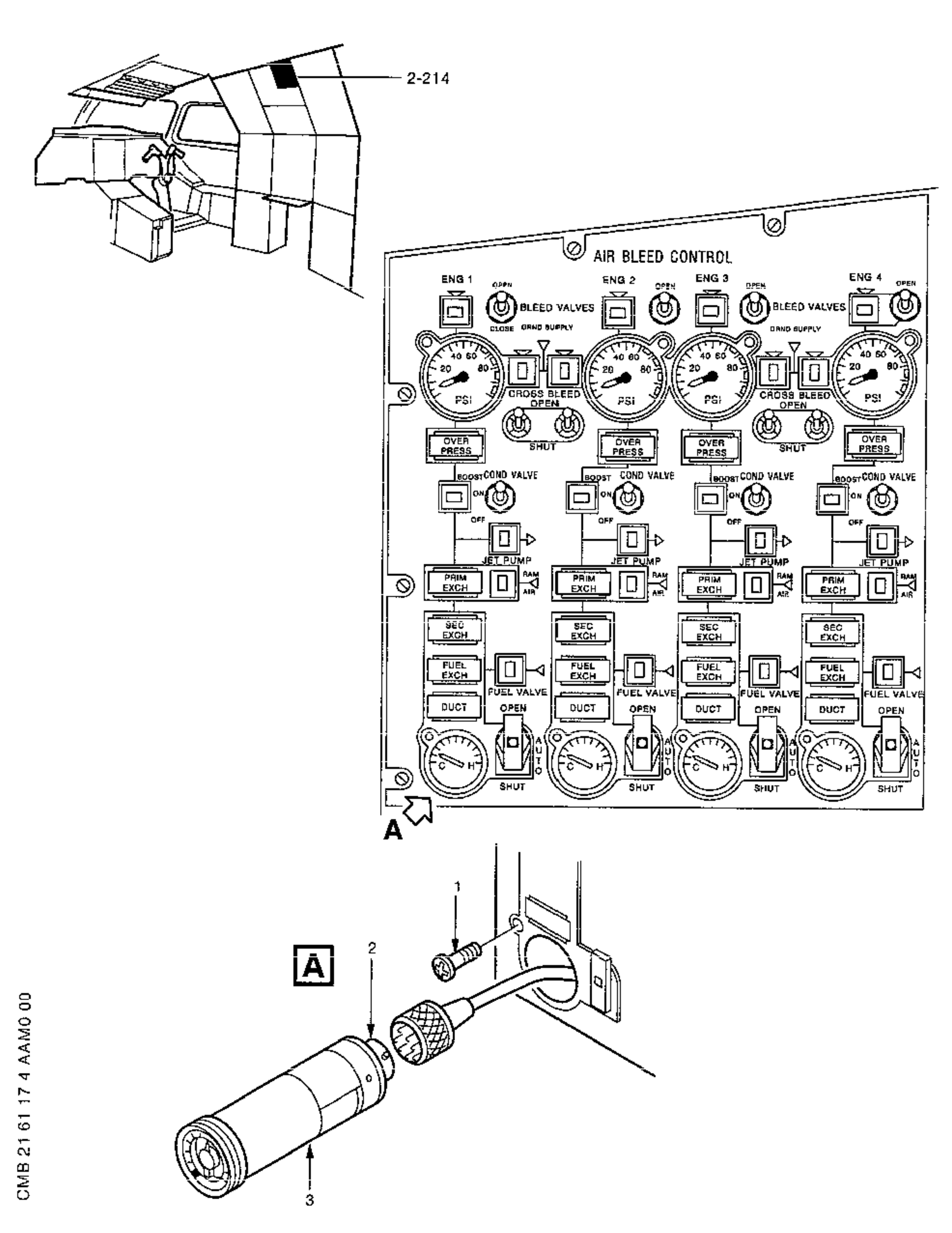
Remove protective plug from electrical connector. Make certain that the pins are not bent or damaged, and that the indicator is not damaged.

E. Install

(1) Connect electrical connector (2) to indicator.

(2) Install the indicator.

(3) Secure indicator by means of securing screw (1).



Temperature Control Valve Position Indicator
Figure 401

B F. Deleted

FUSELAGE MINI-MAXI TEMPERATURE SENSOR - REMOVAL/INSTALLATION

1. General

The fuselage mini-maxi temperature sensor H1040 is located in zone 233 between frames 60 and 61.

2. Fuselage Mini-Maxi Temperature Sensor

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clip	
Corrosion Resistant Steel Lockwire Dia. 0.032 in. (0.8 mm)	

B. Prepare

(1) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 TEMP SELECTOR AUTO SUP & CONT	2-213	H1000	B17

(2) In passenger compartment, open floor panel 233GF.

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1).

(2) Remove lockwire and screws (2).

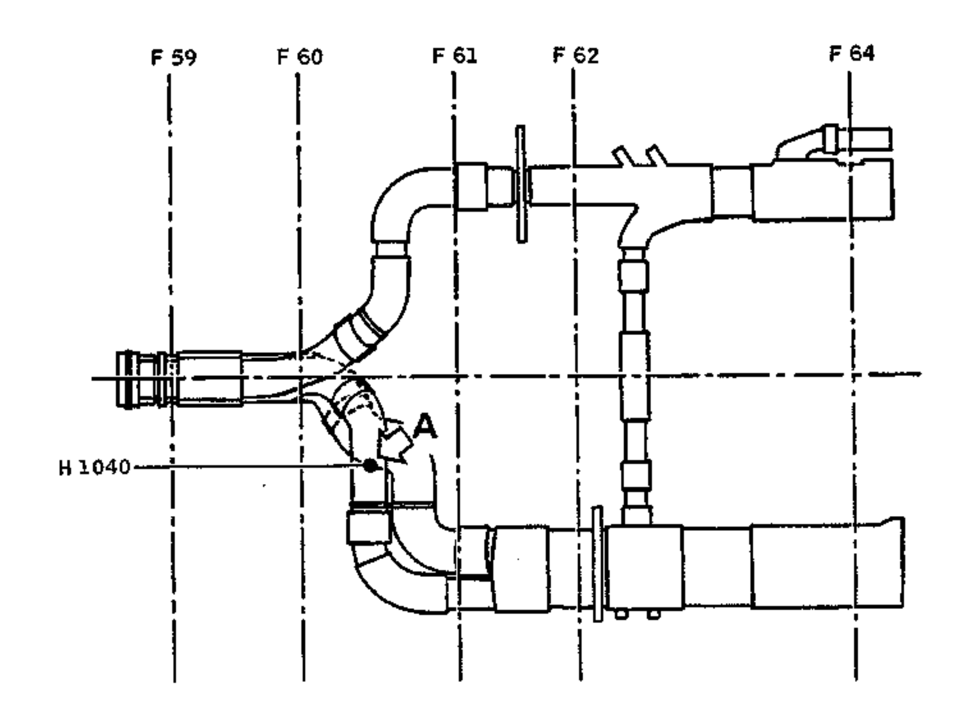
(3) Remove sensor (3) and discard seal (4).

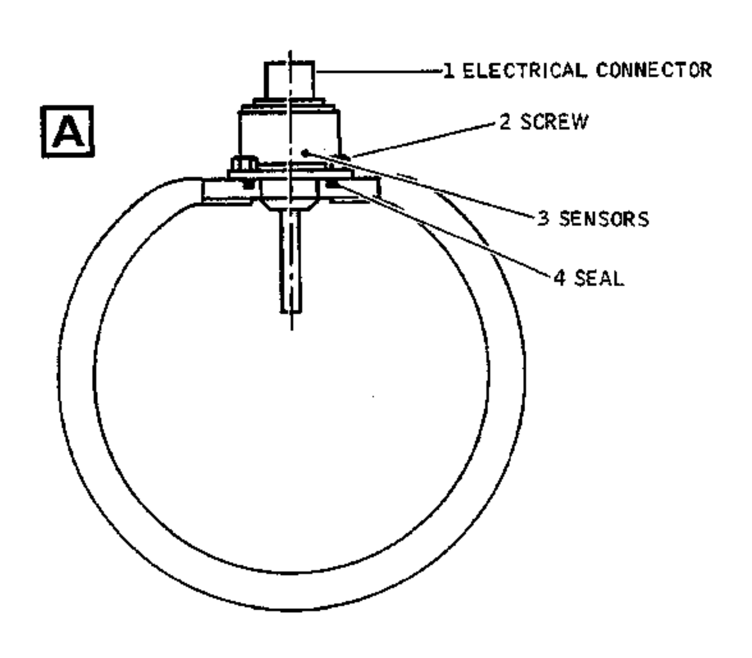
D. Install

(1) Install sensor (3), equipped with a new seal (4).

(2) Install screws (2) and wirelock.

(3) Connect electrical connector (1).





CMA 21 61 18 4 AAMO

Fuselage Mini Maxi Temperature Sensor
Figure 401

E. Close-Up

(1) Close floor panel.

(2) Remove safety clip and tag and reset the circuit breaker tripped in paragraph 2.B (1).

B F. Deleted

END OF THIS SECTION

NEXT

AMBIENT TEMPERATURE SENSOR - REMOVAL/INSTALLATION

1. General

Ambient temperature sensor H1044 is located in zone 211 under Captain's seat

2. Ambient Temperature Sensor

A. Equipment and Materials.

DESCRIPTION	PART NO.
Circuit Breaker Safety Clip	
Corrosion Resistant Steel Lockwire Dia. 0.020 in. (0.5 mm).	

B. Prepare

(1) Trip, Safety and tag the following circuit breakers

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R	GRP1 TEMP SELECTOR AUTO SUP & CONT	2-213	H1000	B17
	FLT DECK TEMP IND	1-213	1D 161	E10
R	GRP1 SAMPLING DUCT FAN SUP	2-213	H1004	B16

(2) Remove panel 211 GS.

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connectors (2), (5) and (6).

(2) Remove screws (1).

(3) Remove sensor/sampling duct fan assembly (8).

(4) On this assembly.

(a) Remove lockwire and screws (7).

(b) Remove sensor (3).

(c) Discard seal (4).

D. Install

(1) On sensor/sampling duct fan assembly (8)

(a) Install sensor (3) equipped with a new seal.

(b) Install screws (7) and wirelock.

(2) Install sensor/sampling duct fan assembly (8); attach with screws.

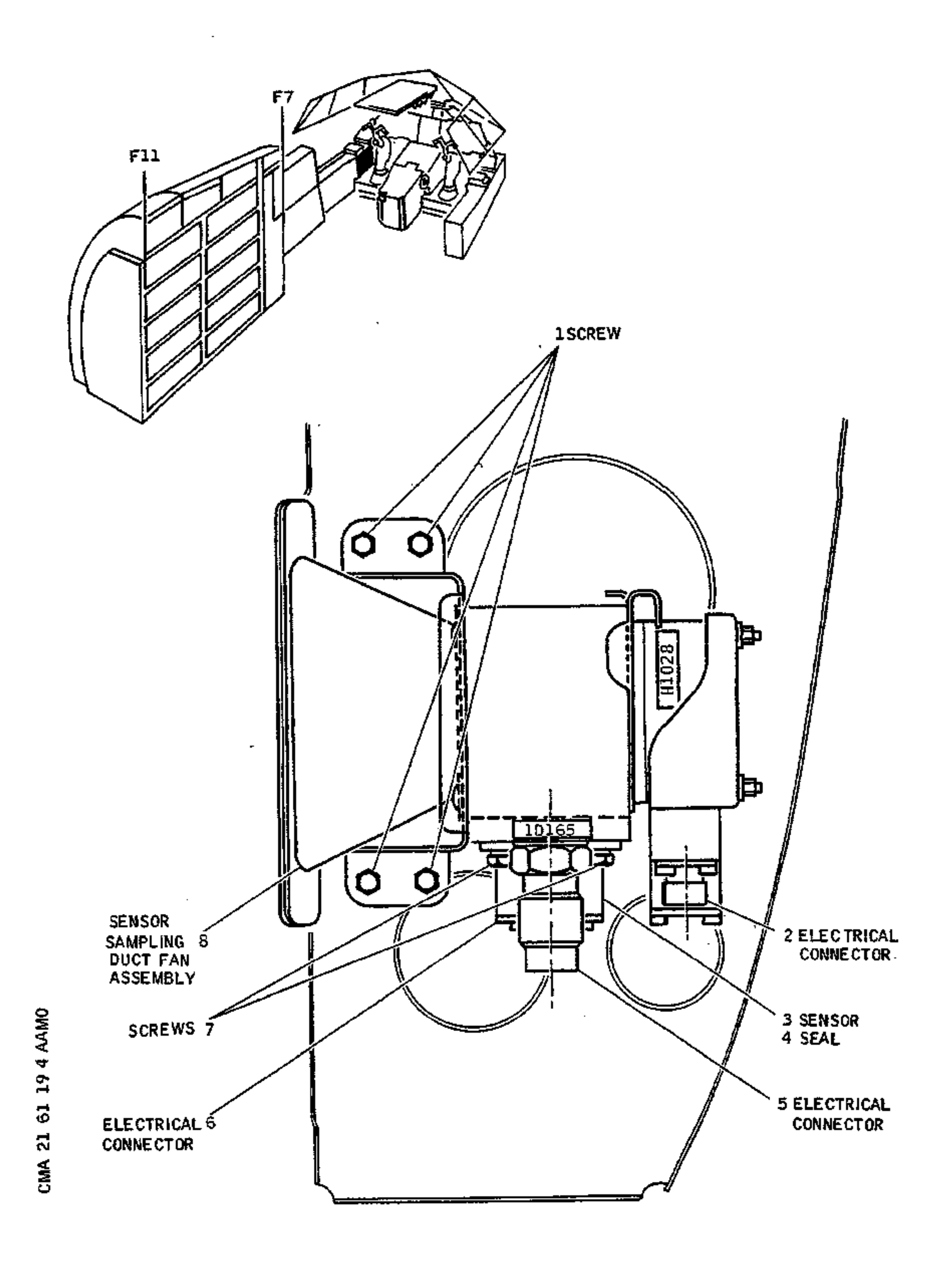
(3) Connect electrical connectors (2), (5) and (6).

E. Close Up

(1) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2. B. (1).

(2) Install panel 211 GS.

B F. Deleted



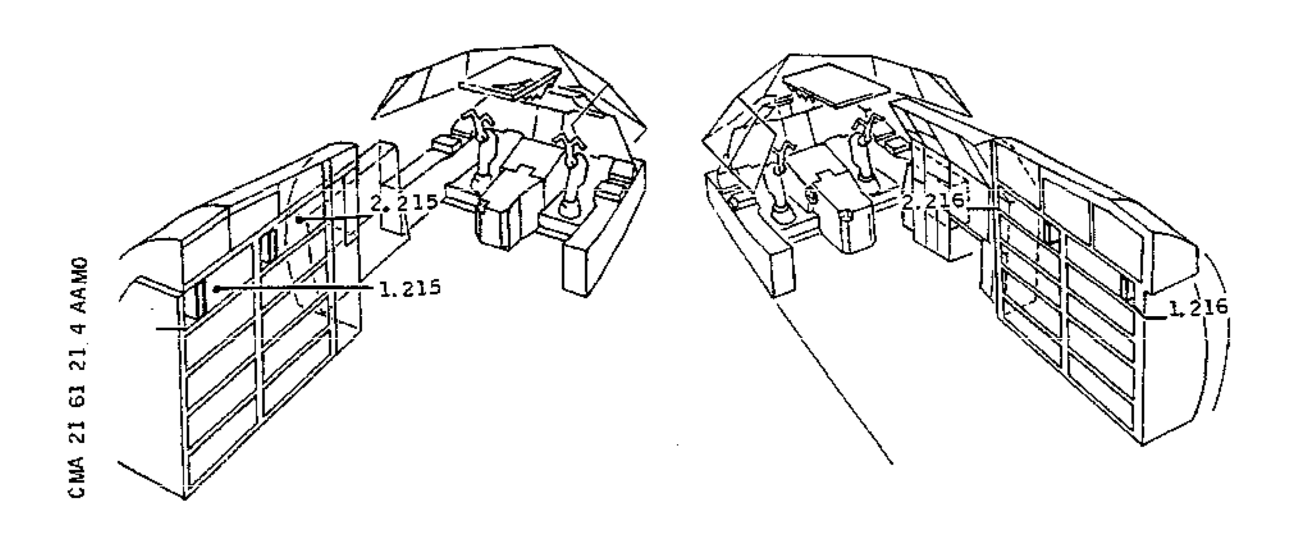
Ambient Temperature Sensor
Figure 401

TEMPERATURE CONTROLLER - REMOVAL/INSTALLATION

1. General

A. The removal/Installation procedure is identical for all temperature controllers ; only the location is different.

2. Temperature Controller (Ref. Fig. 401)



Location of Temperature Controllers
Figure 401

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	

B. Prepare

(1) On electronics racks open the panel corresponding to

temperature controller to be removed.

Panel 2-215 for group 1 Temperature Controller
Panel 1-215 for group 2 Temperature Controller
Panel 1-216 for group 3 Temperature Controller
Panel 2-216 for group 4 Temperature Controller

(2) Trip, safety and tag the following circuit breaker :

(a) For group 1 temperature controller

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 TEMP SELECTOR AUTO SUP & CONT	2-213	H1000	B17

(b) For group 2 temperature controller

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP2 TEMP SELECTOR AUTO SUP & CONT	4-213	H1001	E11

(c) For group 3 temperature controller

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP3 TEMP SELECTOR AUTO SUP & CONT	2-213	H1002	G16

(d) For group 4 temperature controller

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP4 TEMP SELECTOR AUTO SUP & CONT	4-213	H1003	B12

C. Remove

(1) Unscrew attaching nut until it is out of the tab.

(2) Move screw and nut assembly downwards.

(3) Pull temperature controller : hold it to prevent it from falling when it is out of the rack.

R (4) Note condition of rear electrical connector, as a guide
R to reactionnary damage to its mating rack connector
R which may be found in paragraph D-(1) below :

D. Preparation of Replacement Component

(1) Make certain that electrical connector is in good condition (on rack side and on temperature controller side).

(2) Check that temperature controller is free from dents or traces of corrosion.

E. Install

(1) Install temperature control valve in its location.

(2) Lift the screw and nut assenbly and screw the latter in tab in forward face of temperature controller.

(3) Tighten nut fully.

F. Close-Up

(1) Remove safety clip and tag and reset the following circuit breaker :

(a) For group 1 temperature controller

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 TEMP SELECTOR AUTO SUP & CONT	2-213	H1000	B17

(b) For group 2 temperature controller

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP2 TEMP SELECTOR AUTO SUP & CONT	4-213	H1001	E11

(c) For group 3 temperature controller

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP3 TEMP SELECTOR AUTO SUP & CONT	2-213	H1002	G16

(d) For group 4 temperature controller

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP4 TEMP SELECTOR AUTO SUP & CONT	4-213	H1003	B12

(2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(3) On electronics racks, close panel corresponding to temperature controller removed :

Door 2-215 for group 1 temperature controller
Door 1-215 for group 2 temperature controller
Door 1-216 for group 3 temperature controller
Door 2-216 for group 4 temperature controller

B G. Deleted

(1) Unscrew attaching nut until it is out of the tab.

(2) Move screw and nut assembly downwards.

(3) Pull temperature controller. Hold it to prevent it from falling when it is out of the rack.

RB (4) Examine rack and unit connectors for:

RB (a) Bent, damaged or corroded contact pins.

RB (b) Distorted, displaced or blackened socket
RB contacts.

RB (c) Pierced, or otherwise damaged dielectric.

RB (d) Connector body free from damaged polarising posts
RB and keyways.

RB <u>NOTE</u>: If connector is damaged refer to WDM 20-42-71.

D. Preparation of Replacement Component

RB (1) Examine unit connector for:

RB (a) Bent, damaged or corroded contact pins.

RB (b) Distorted, displaced or blackened socket
RB contacts.

RB (c) Pierced, or otherwise damaged dielectric.

RB (d) Connector body free from damaged polarising posts
RB and keyways.

RB <u>NOTE</u>: If connector is damaged refer to WDM 20-42-71.

(2) Check that temperature controller is free from dents or traces of corrosion.

E. Install

(1) Install temperature control valve in its location.

(2) Lift the screw and nut assembly and screw the latter in tab in forward face of temperature controller.

(3) Tighten nut fully.

F. Close-Up

(1) Remove safety clip and tag and reset the following circuit breaker:

(a) For group 1 temperature controller

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 TEMP SELECTOR AUTO SUP & CONT	2-213	H1000	B17

(b) For group 2 temperature controller

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP2 TEMP SELECTOR AUTO SUP & CONT	4-213	H1001	E11

(c) For group 3 temperature controller

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP3 TEMP SELECTOR AUTO SUP & CONT	2-213	H1002	G16

(d) For group 4 temperature controller

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP4 TEMP SELECTOR AUTO SUP & CONT	4-213	H1003	B12

(2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(3) On electronics racks, close panel corresponding to temperature controller removed:

Door 2-215 for group 1 temperature controller
Door 1-215 for group 2 temperature controller
Door 1-216 for group 3 temperature controller
Door 2-216 for group 4 temperature controller

TEMPERATURE SELECTOR - REMOVAL/INSTALLATION

1. General

The temperature selector H1019 is located on Flight Engineer TEMPERATURE CONTROL panel 2-214.

2. Temperature Selector H1019

A. Equipment and Materials

DESCRIPTION	PART NO.
Not Applicable	

B. Prepare

WARNING : AS A SAFETY MEASURE AND IN ORDER TO TAKE ALL NECESSARY PRECAUTIONS AGAINST INADVERTENT OPERATIONS, DISPLAY A WARNING NOTICE ON THE ELECTRICAL GROUND CONNECTOR PROHIBITING ENERGIZATION OF THE AIRCRAFT ELECTRICAL NETWORK.

(1) On EMERG GEN Flight Engineer panel 6-214, make certain that BATT A and BATT B switches are in OFF position.

WARNING : AS A SAFETY MEASURE AND IN ORDER TO TAKE ALL NECESSARY PRECAUTIONS AGAINST INADVERTENT OPERATIONS, DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF BATT A AND BATT B SWITCHES.

(2) At Flight Engineer station, open TEMPERATURE CONTROL panel 2-214 (12 1/4 turn fasteners).

C. Remove

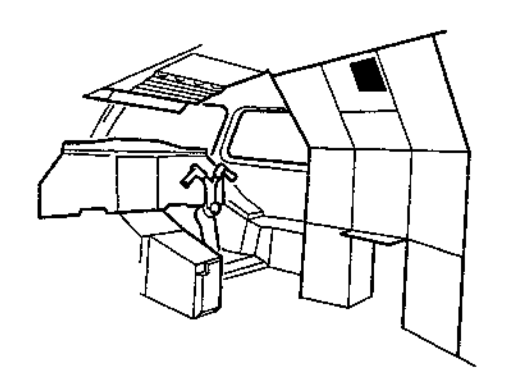
(1) On Flight Engineer TEMPERATURE CONTROL panel, unscrew connector H1019A from temperature selector.

(2) Unscrew attaching screws (access through forward face of panel) while holding selector with one hand.

(3) Remove temperature selector.

D. Preparation of Replacement Component

(1) Make certain that selector shows no dents or scratched paint.



PANEL 2-214

TEMPERATURE CONTROL

LEAK LEAK LEAK LEAK

FLIGHT DECK

ON

FAILED

COMPARATOR

FWD CABIN

GROUP 3 OR 4

REAR CABIN

ON GROUP 1 FAILED

ON GROUP 2 FAILED

ATTACHING SCREWS (1)

AUTO

COLD

HOT

STANDBY

TEMPERATURE SELECTORS

H1019

CMB 21 61 22 4 AAM0 00

Location of Temperature Selector H1019
Figure 401

(2) Remove protective cap from electrical connector ; make certain that pin are neither distorted nor damaged.

E. Install

(1) Install selector on panel ; screw attaching screws (located on front face of panel).

(2) Connect electrical connector (H1019A) to temperature selector.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(3) Close TEMPERATURE CONTROL panel 2-214 (12 1/4 turn fasteners).

B F. Deleted

G. Close-Up

(a) Ground connector.

(b) EMERG GEN panel.

TEMPERATURE CONTROL VALVE - REMOVAL/INSTALLATION

1. General

Removal/Installation procedure of temperature control valves is identical for each group.

2. Temperature control valve

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	

B. Prepare

(1) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1			
GRP 1 TEMP SELECTOR MANL SUP and CONT	1-213	H 991	E11
GRP 1 TEMP SELECTOR AUTO-SUP and CONT	2-213	H1000	B17
Group 2			
GRP 2 TEMP SELECTOR AUTO SUP and CONT	4-213	H1001	E11
GRP 2 TEMP SELECTOR MANL SUP and CONT	5-213	H 992	B 8
Group 3			
GRP 3 TEMP SELECTOR AUTO SUP and CONT	2-213	H1002	G16
GRP 3 TEMP SELECTOR MANL SUP and CONT	15-215	H 993	D 3
Group 4			
GRP 4 TEMP SELECTOR AUTO SUP and CONT	4-213	H1003	B12

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP 4 TEMP SELECTOR MANL SUP and CONT	15-216	H 994	C24

(2) On wing, open the relevant access doors.

Group 1 Zone 534, Door CT
Group 2 Zone 533, Door DT
Group 3 Zone 633, Door DT
Group 4 Zone 634, Door CT

C. Remove (Ref. Fig. 401, 402 and 403)
(Ref. Fig. 404)

(1) Disconnect electrical connectors (1) and (2) (Marked red and blue).

(2) Disconnect union (3).

(3) Disconnect bonding strip (4) on aircraft side.

(4) Remove clamps (5) and (6).

(5) Remove valve (7).

(6) Remove bonding strip (4) from removed valve.

D. Preparation of Replacement Component

(1) Install bonding strip on valve (7).

E. Install

(1) Install valve (7), clamps (5) and (6) ; do not tighten them.

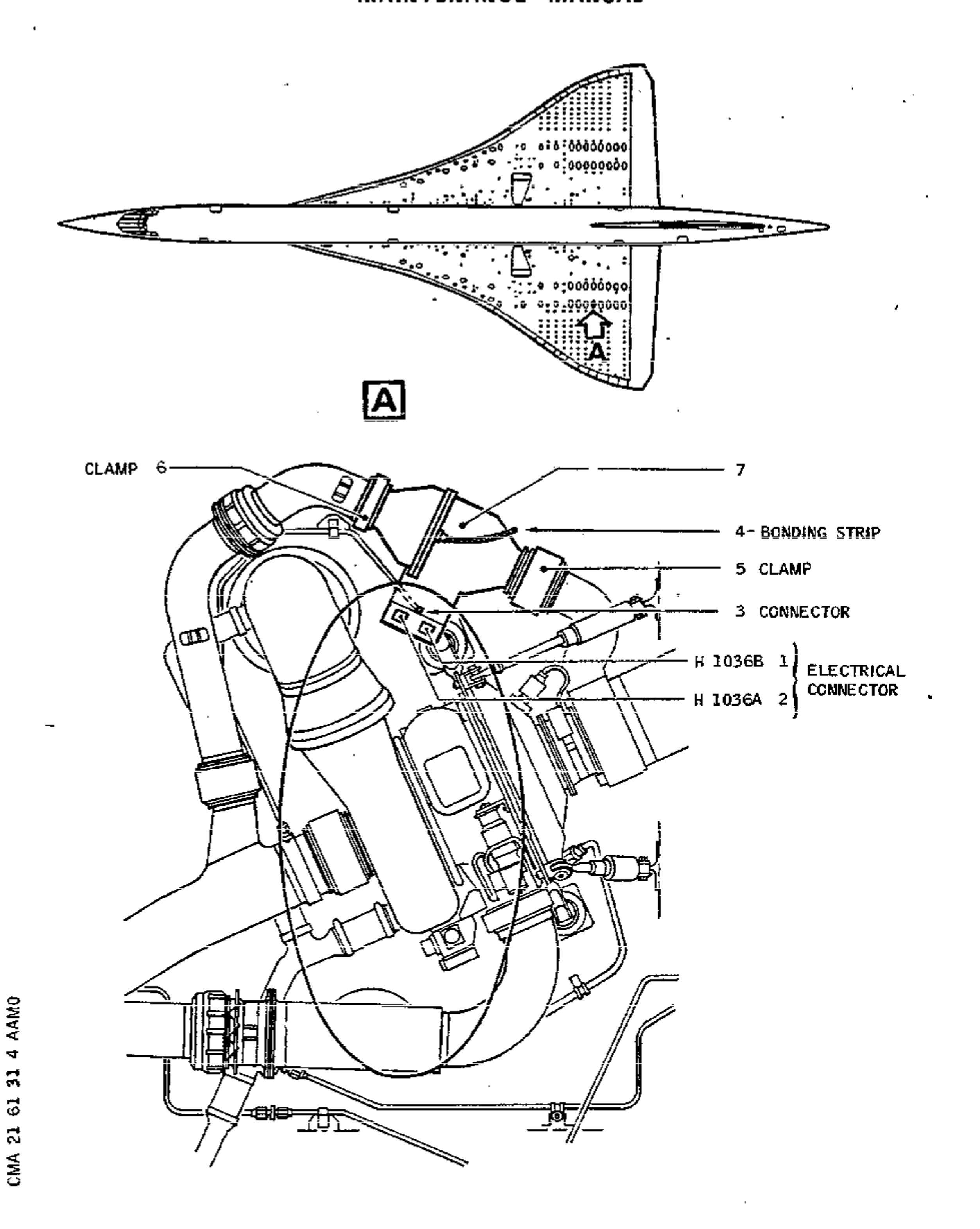
(2) Connect union (3).

(3) Tighten clamps (5) and (6).

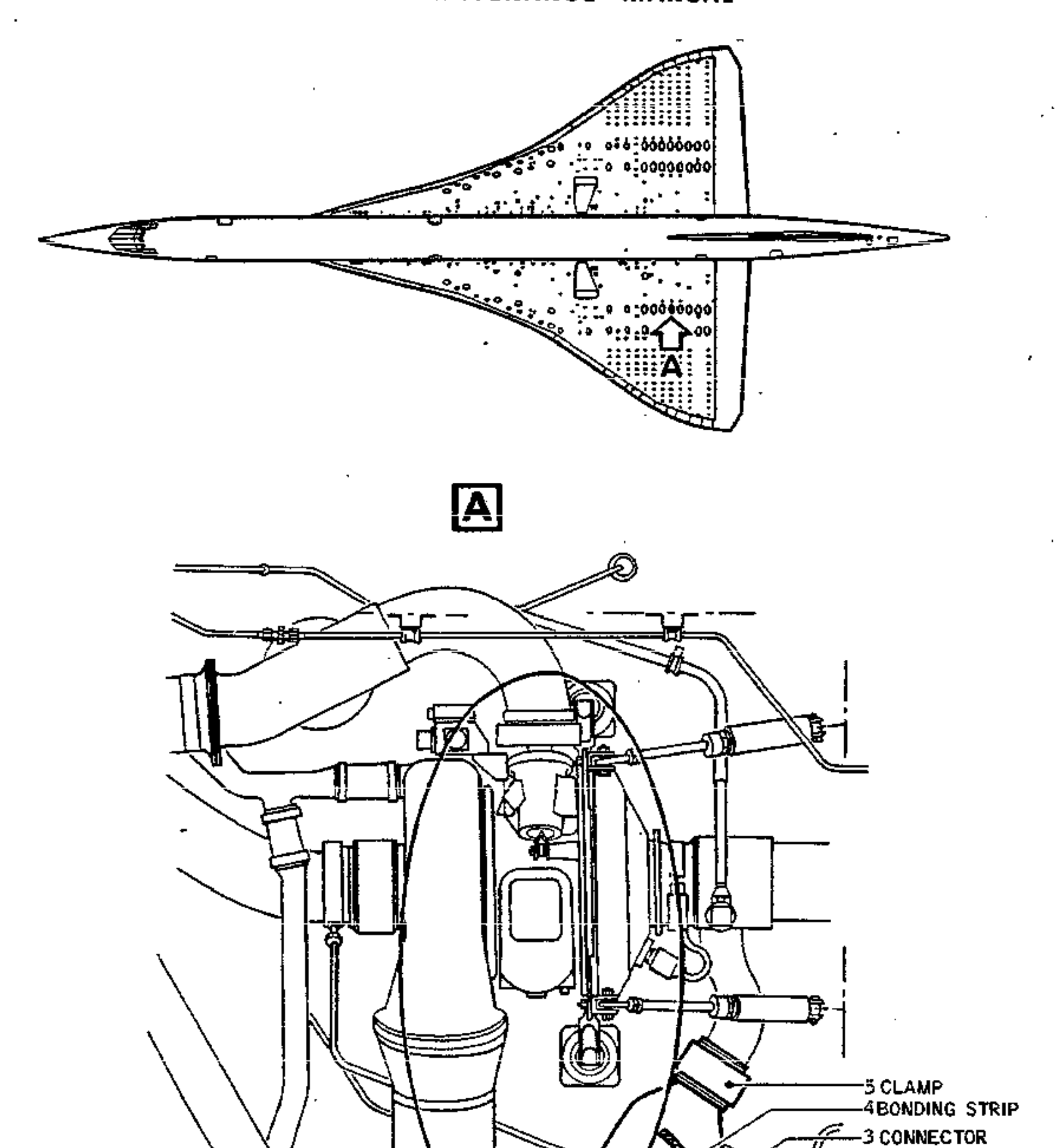
(4) Connect electrical connectors (1) and (2).

(5) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2B (1).

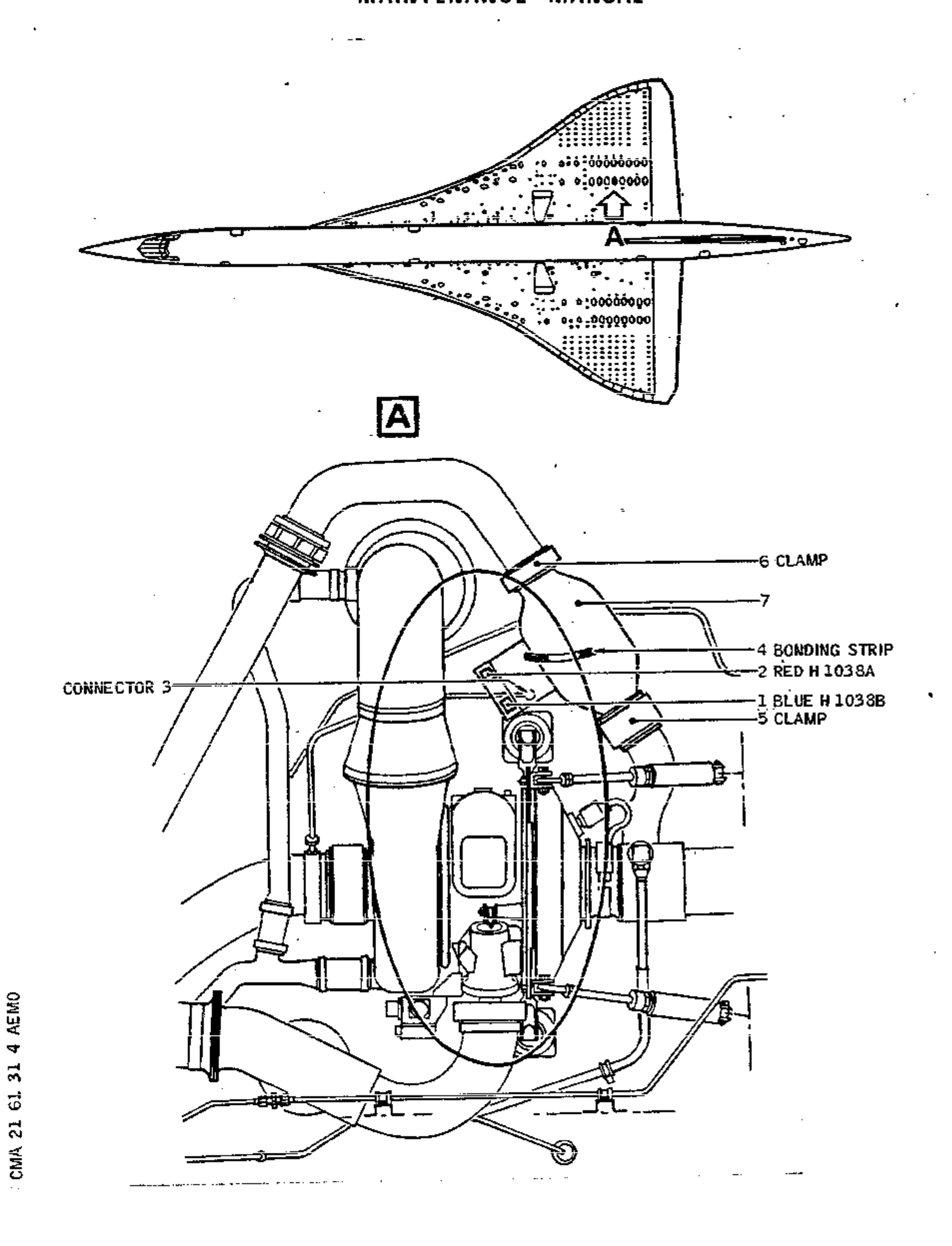
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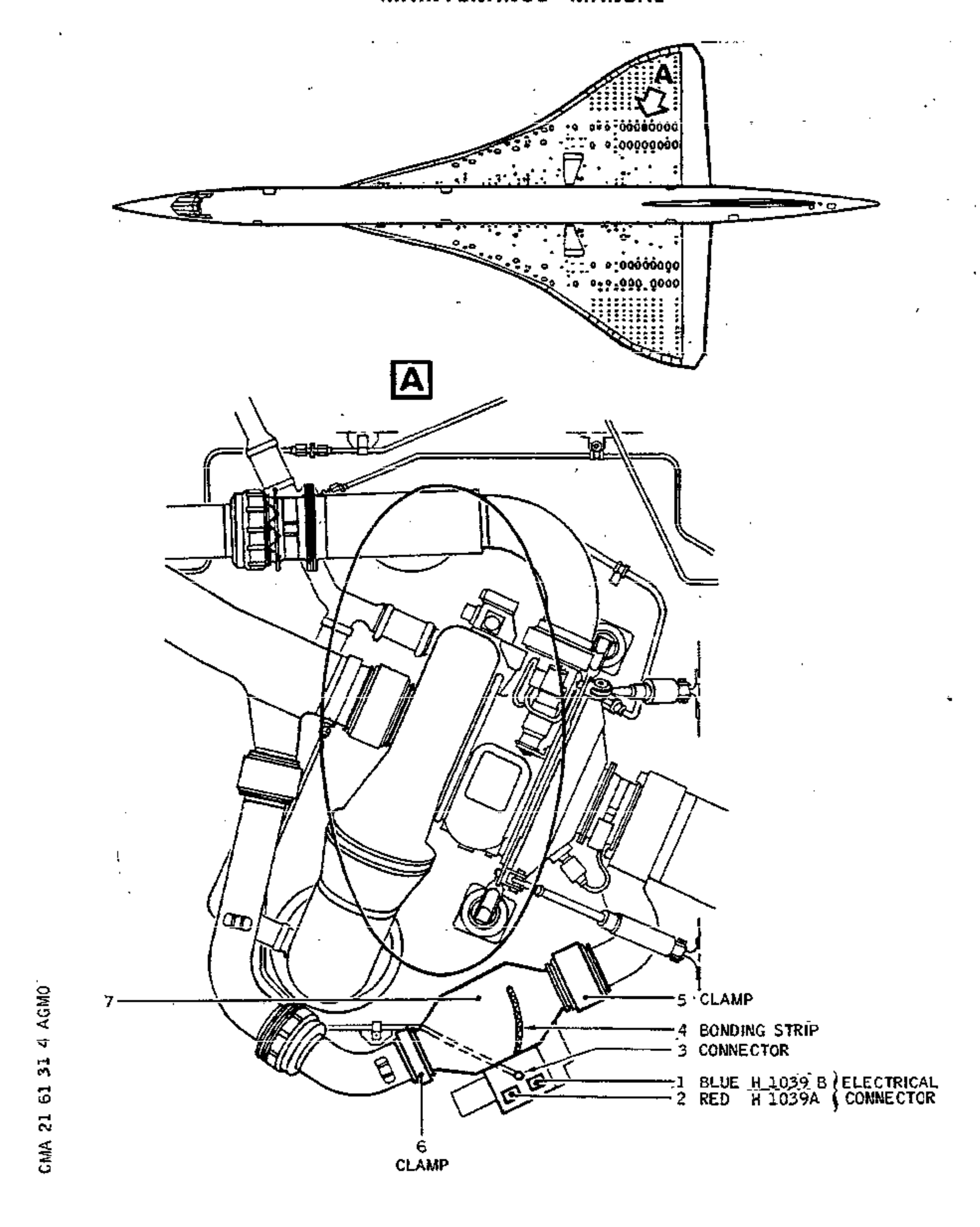
Group 1 Temperature Control Valve
Figure 401



Group 2 Temperature Control Valve
Figure 402



Group 3 Temperature Control Valve
Figure 403



Group 4 Temperature Control Valve
Figure 404

G. Close-Up

Close access door opened in paragraph 2B (2).

TEMPERATURE CONTROL VALVE - ADJUSTMENT/TEST

1. General

The purpose of this test is to check the temperature control valve for evidence of leakage and security of attachment after a removal/installation operation. The test covers the temperature control valves of the four groups.

2. Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Ground Air Supply Unit : - Relative Minimum Pressure 2 bars, airflow 0.4 kg/sec - Relative Maximum Pressure 4.5 bars, airflow 0.6 kg/sec (Temperature must not exceed 300°C)	

B. Prepare

(1) Connect electrical ground power unit and energize the
R aircraft electrical network (Ref. 24-41-00, Servicing).

R (2) Trip, safety and tag the air start valve circuit brea-
R kers :

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R	ENG 1 & 4 AIR START CONT	15-215	K 181	C15
R	ENG 2 & 3 AIR START CONT	15-216	K 182	D11

R (3) On AIR BLEED CONTROL panel, check that the following
R switches are in the position indicated below BLEED VAL-
R VE in SHUT position
R CROSS BLEED in SHUT position
R COND VALVE in OFF position.

R (4) Check that the following circuit breakers are set :

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
	GRP1 TEMP SELECTOR MANL SUP AND CONT	1-213	H 991	F11
	GRP1 SAMPLING DUCT FAN SUP	2-213	H1004	B16
	GRP1 TEMP SELECTOR AUTO SUP AND CONT	2-213	H1000	B17
R	GRP1 ICE DETECTOR SENSOR SUP	15-215	H 995	D 4
	GRP2 SAMPLING DUCT FAN SUP	4-213	H1005	D12
	GRP2 TEMP SELECTOR AUTO SVP AND CONT	4-213	H1001	E11
R	GRP2 TEMP SELECTOR MANL SUP AND CONT	5-213	H 992	B 8
R	GRP2 ICE DETECTOR SENSOR SUP	15-216	H 996	D24
	GRP3 TEMP SELECTOR AUTO SUP AND CONT	2-213	H1002	G16
	GRP3 ICE DETECTOR SENSOR SUP	15-215	H 997	E 4
	GRP3 TEMP SELECTOR MANL SUP AND CONT	15-215	H 993	D 3
	GR4 TEMP SELECTOR AUTO SUP AND CONT	4-213	H1003	B12
	GRP3 AND 4 COMPTR CONT	4-213	H1006	C11
R	TEMP COMPTR IND AND GRP SELECT M1 SUP	5-213	H 999	B 9
	GRP4 TEMP SELECTOR MANL SUP AND CONT	15-216	H 994	C24
	GRP4 ICE DETECTOR SENSOR SUP	15-216	H 998	E23
	GRP1 TEMP VALVE POSN IND	13-215	H1007	E 1
	GRP2 TEMP VALVE POSN IND	13-215	H1008	E 2
	GRP3 TEMP VALVE POSN IND	13-216	H1009	C19
	GRP4 TEMP VALVE POSN IND	13-216	H1010	D19

R (5) Connect the ground air supply unit and pressurize the aircraft.

R (a) Pressurize fuel system

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WARNING : OBSERVE FUEL SYSTEM SAFETY PRECAUTIONS DESCRIBED IN 28-00-00 AND 28-10-00.

NOTE : Pressurization assumes a minimum quantity of fuel of 2500 kg in appropriate feed tank (1, 2, 3, 4).

On centre console, place throttle control levers in SHUT position (lower mechanical stop).

Check that crossfeed valves are closed and that associated magnetic indicators display vertical stripes.

With the LP VALVE switch locked at open by the switch guard, check that the associated magnetic indicator shows an in-line indication. Place the first of the three ENGINE FEED PUMPS control switches in ON position (MAIN PUMP).

Engine 1 Main Fuel Pump for group 1
Engine 2 Main Fuel Pump for group 2
Engine 3 Main Fuel Pump for group 3
Engine 4 Main Fuel Pump for group 4

Check that corresponding LOW PRESS indicator light goes off when pump operating pressure is reached.

WARNING : FUEL SYSTEM MUST NOT OPERATE MORE THAN 2 HOURS.

R (b) In case Fuel system cannot be used :

R Trip, safety and tag one of the following circuit breakers :

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R	For GRP 1 LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
R	For GRP 2 LH UC WEIGHT SW B SYS SUP	3-213	G 293	B 8
R	For GRP 3 RH UC WEIGHT SW B SYS SUP		G 294	B 9
	For GRP 4	1-213	G 295	M18

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RH UC WEIGHT SW A SYS SUP			

WARNING : DURING TEST, FUEL EXCH WARNING LIGHT MAY ILLUMINATE. ON PANEL 2-214 PLACE FUEL VALVE SWITCH IN OPEN POSITION (SELF-HOLDING CANCELLATION).

C. Test

R (1) On AIR BLEED CONTROL panel 2-214, place CROSS BLEED switch in OPEN position.
CROSS BLEED magnetic indicator displays a horizontal stripe. Pressure value increases at pressure gage.

R (2) COND VALVE switch in ON position.
COND VALVE magnetic indicator displays a vertical stripe.

R (3) On TEMPERATURE CONTROL panel, MASS FLOW indicator must indicate that flow increases.

R (4) On TEMPERATURE CONTROL panel move temperature selector from COLD to HOT in the AUTO range.

R (5) On AIR BLEED CONTROL panel, check that temperature control valve position indicator indicates that the valve is open.

On TEMPERATURE CONTROL panel 2-214, check that tempera-
R ture increases on dual air conditioning temperature
R indicator (DUCT range).

R (6) Return the temperature selector to COLD position through the AUTO range.
The valve closes.
Valve position indicator pointer is in C position.

R (7) On TEMPERATURE CONTROL panel, move temperature selector from COLD to HOT through the STANDBY range.
On AIR BLEED CONTROL panel, check that valve position indicator indicates that the valve is open.

On TEMPERATURE CONTROL panel 2-214, check that tempe-
R rature increases on dual air conditioning temperature
R indicator (DUCT range).

R (8) Check the valve attachment clamps for evidence of leakage. Access is gained through access doors located on upper surface :
on LH wing
door CT for Group 1
door DT for Group 2
on RH wing
door DT for Group 3
door CT for group 4

R (9) On TEMPERATURE CONTROL panel, return temperature selector from HOT to COLD position through to STANDBY range. Temperature control valve position indicator must return to C.

R (10) Return CROSS BLEED and COND VALVE switches in SHUT position. COND VALVE magnetic indicator displays a vertical stripe and CROSS BLEED magnetic indicator displays a vertical stripe. MASS FLOW indicator indicates 0.

D. Close-Up

(1) In case the Fuel system has been pressurized.

Place ENGINE FEED PUMP switch in OFF position. After a few seconds the corresponding LOW PRESS indicator light must illuminate.

If necessary, remove safety clip and tag and reset circuit breaker tripped in paragraph 2B (4).
If FUEL EXCH warning has come on during test after switching off the ground air supply unit, wait for cancellation of warning and place FUEL VALVE switch in AUTO position.

(2) Shut down ground air supply unit and disconnect it from the aircraft.

R (3) Remove safety clips and tags and reset the circuit
R breaker tripped in paragraph 2B (2).

R (4) De-energize the aircraft electrical network and disconnect electrical ground power unit.

COLD AIR UNIT OUTLET ICE SENSOR
TRANSDUCER - REMOVAL/INSTALLATION

1. General

R B A. The removal/installation procedure is identical for the
R B two ice sensor transducers

2. Cold Air Unit Outlet Ice Sensor Transducer

A. Equipment and Materials

DESCRIPTION	PART NO.
1 Access Platform	
Circuit Breaker Safety Clip	

B. Prepare

(1) Position access platform

R B (2) Open the relevant door

R B 534ET for group 1 ice sensor transducer
R B 533FT for group 2 ice sensor transducer NOT FITTED
R B 633FT for group 3 ice sensor transducer CM21C012 Refers
R B 634ET for group 4 ice sensor transducer

R (3) Trip safety and tag the relevant circuit breaker accor-
R ding to the ice sensor transducer to be removed

R (a) Group 1

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 ICE DETECTOR SENSOR SUP	15-215	H 995	D 4

R (b) Group 2

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP2 ICE DETECTOR SENSOR SUP	15-216	H 996 INOPERATIVE	D24

(c) Group 3

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP3 ICE DETECTOR SENSOR SUP	15-215	H 997 INOPERATIVE	E 4

(d) Group 4

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP4 ICE DETECTOR SENSOR SUP	15-216	H 998	E23

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (3)

(2) Unscrew and remove coupling (8)

(3) Unscrew and remove coupling (7) slightly unscrew coupling (5) in order to remove ice sensor grille (4) pipe (6)

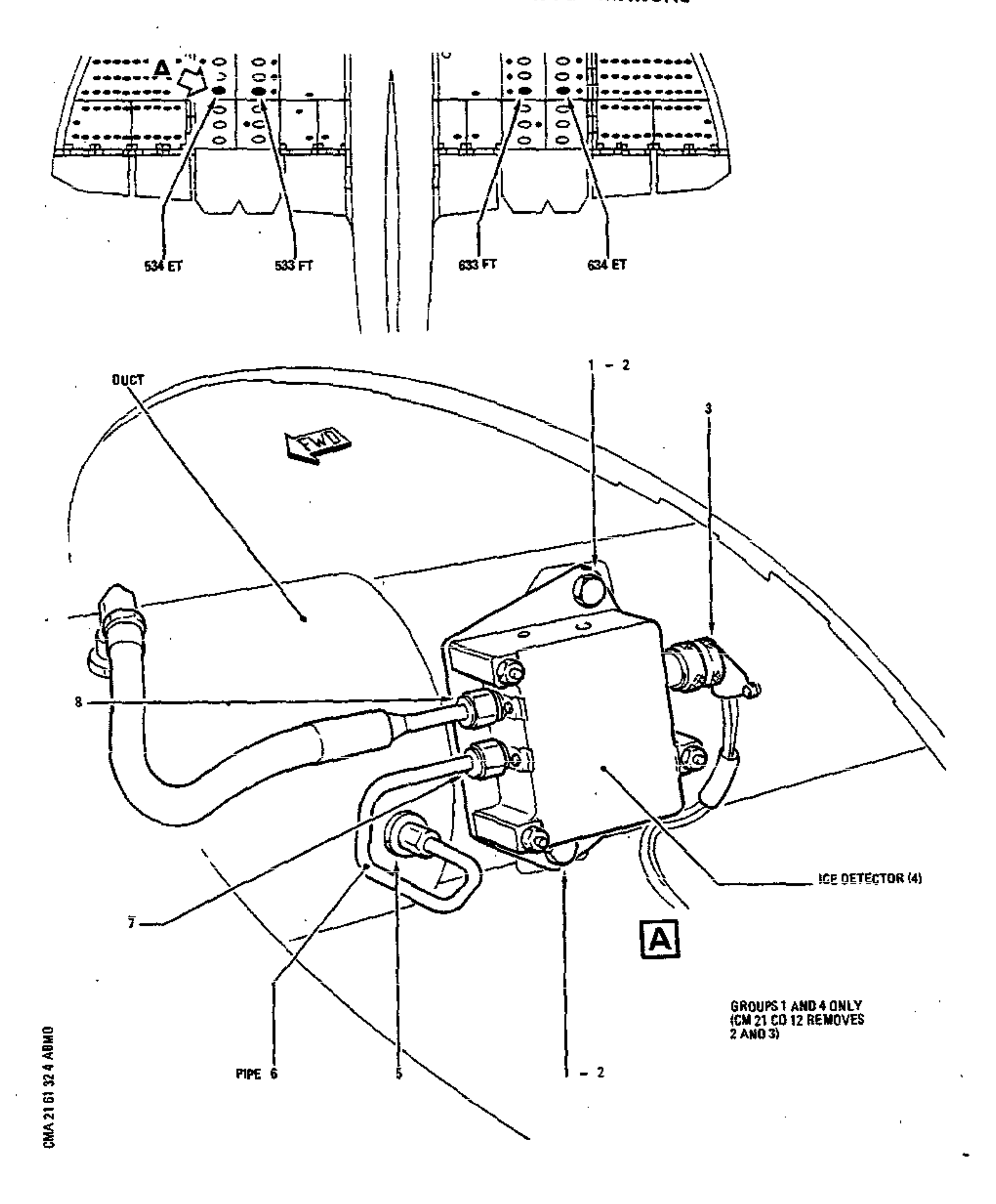
(4) Unscrew both attaching screws (1), retain both washers (2)

(5) Remove ice sensor transducer (4) (groups 1 and 4 only)

D. Preparation of Replacement Component

(1) Make certain that couplings and electrical connector are in good condition

(2) Check that ice sensor transducer is free from dents and traces of corrosion.



R

Cold Air Unit Ice Sensor Transducer
Figure 401

B

E. Install

(1) Install ice sensor transducer (4) (groups 1 and 4 only)

(2) Screw both attaching screws (1) equipped with wag- hers (2)

(3) Connect pipe (6); tighten couplings (5) and (7)

(4) Connect upstream pressure pipe; tighten coupling (8)

(5) Connect electrical connector (3)

F. Close Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment

(2) Close access door :

534ET for group 1 ice sensor transducer
533FT for group 2 ice sensor transducer NOT FITTED
633FT for group 3 ice sensor transducer CM21C012 Refers
634ET for group 4 ice sensor transducer

(3) Remove Access Platform

(4) Remove safety clips and tags and reset the following circuit breakers

(a) Group 1

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 ICE DETECTOR SENSOR SUP	15-215	H 995	D 4

(b) Group 2

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP2 ICE DETECTOR SENSOR SUP	15-216	H 996 INOPERATIVE	D24

(c) Group 3

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP3 ICE DETECTOR SENSOR SUP	15-215	H 997 INOPERATIVE	E 4

(d) Group 4

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP4 ICE DETECTOR SENSOR SUP	15-216	H 998	E23

COLD AIR UNIT OUTLET ICE SENSOR TRANSDUCER - ADJUSTMENT/TEST

1. General

A. The purpose of this test is to check that ice sensor transducers operate correctly

R B B. Tests to be carried out on the two ice sensor transducers
R B is identical, only test for one ice sensor transducer is
R B described in this topic

2. Functional Test

A. Equipment and Materials

DESCRIPTION	PART NO.
One Electrical Ground Power Unit	
1 Dry Air Supply Unit	
1 Pressure Gauge 0.10psi (0 - 0.689bars)	
1 Air Vent Valve	
A Digital Voltmeter	
1 Ground Service Telephone	
1 Access Platform (wing upper surface)	
1 Access Platform 3.22m (10 ft. 7 in.)	

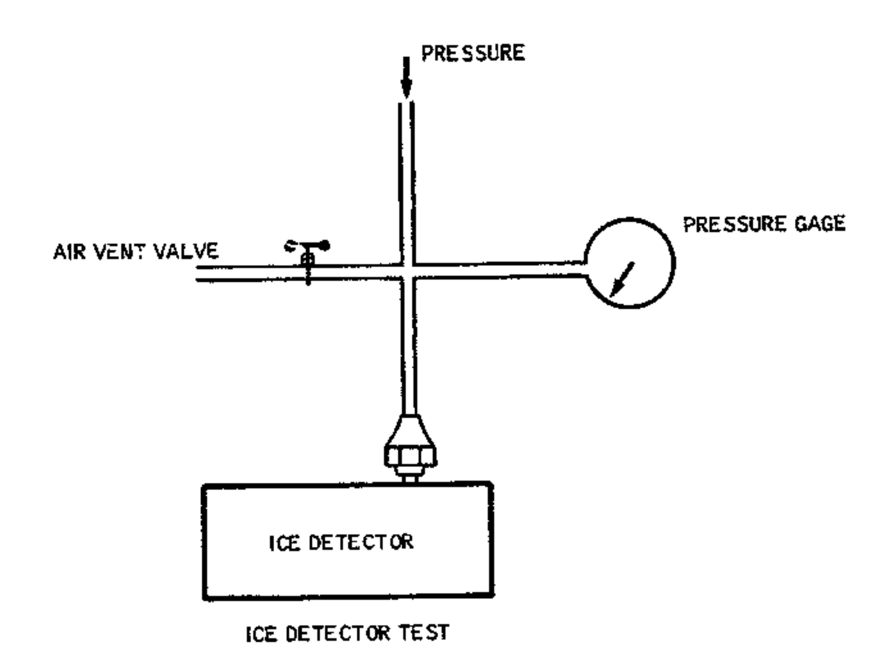
B. Prepare (Ref. Fig. 501)

(1) Install access platform to gain access to the wing upper surface and to the lower part of the fuselage

R (2) Open access door

R 534ET for group 1 ice sensor transducer
R B 533FT for group 2 ice sensor transducer NOT FITTED CM
R B 633FT for group 3 ice sensor transducer 21C012 Refers
R 634ET for group 4 ice sensor transducer

(3) Open door :



CMA 21 61 32 5 AAM0

Ice Sensor Transducer Test
Figure 501

- 123AB to gain access to ambient pressure switch of groups 1 or 3
- 123BB to gain access to ambient pressure switch of groups 2 or 4

(4) Trip, safety and tag the following circuit breaker according to the ice sensor transducer to be tested

(a) Group 1

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 AIR GEN CONT & IND	1-213	1H 862	D13

(b) Group 2

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP2 AIR GEN CONT & IND	5-213	2H 862	F 9

(c) Group 3

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP3 AIR GEN CONT & IND	15-215	3H 862	B 4

(d) Group 4

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP4 AIR GEN CONT & IND	15-216	4H 862	B23

R (5) Disconnect electrical connector from ambient pressure switch corresponding to ice sensor transducer to be tested

R H1032 A for group 1 ice sensor transducer
R B H1033 A for group 2 ice sensor transducer NOT FITTED CM
R B H1034 A for group 3 ice sensor transducer 21C012 Refers
R H1035 A for group 4 ice sensor transducer

R Shunt terminals B and C of electrical connector on aircraft wiring side

(6) On ice sensor transducer, disconnect coupling from duct upstream of ice sensor transducer grille

(7) Connect dry air supply unit to ice sensor transducer

(8) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, S)

R (9) According to ice sensor transducer to be tested, check that the following circuit breakers are set or set them

(a) Group 1

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP1 ICE DETECTOR SENSOR SUP	15-215	H 995	D 4
GRP1 AIR GEN CONT & IND	1-213	1H 862	D13

(b) Group 2

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP2 ICE DETECTOR SENSOR SUP	15-216	H 996 INOPERATIVE	D24
GRP2 AIR GEN CONT & IND	5-213	2H 862	F 9

(c) Group 3

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP3 ICE DETECTOR SENSOR SUP	15-215	H 997 INOPERATIVE	E 4
GRP3 AIR GEN CONT & IND		3H 862	B 4

(d) Group 4

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP4 ICE DETECTOR SENSOR SUP	15-216	H 998	E23
GRP4 AIR GEN CONT & IND	15-216	4H 862	B23

(10) Unscrew cap located on the front face of temperature controller H1023/H1026 corresponding to ice sensor transducer to be tested

C. Test

WARNING : BEFORE PROCEEDING WITH TESTS MAKE CERTAIN THAT THE TEST EQUIPMENT IS FITTED WITH A SAFETY DEVICE PROVIDING ABSORPTION OF POSSIBLE OVERPRESSURE WHICH MIGHT DAMAGE THE ICE SENSOR TRANSDUCERS.

(1) Progressively increase pressure applied to ice sensor transducer from 0 to 2 psi.
For each pressure value noted below, there is a corresponding voltage value read between terminals C and N of electrical connector located on front face of corresponding temperature controller

PRESSURE	VOLTAGE
0	0V ± 20mV
0.4 psi (27.58mb)	1V ± 20mV
0.8 psi (55.15mb)	2V ± 20mV
1.2 psi (82.73mb)	3V ± 20mV
1.6 psi (110.31mb))	4V ± 20mV
2 psi	5V ± 20mV

(2) Decrease pressure of dry air supply unit

D. Close Up

(1) Screw cap on front face of pressure controller

(2) De-energize the aircraft electrical network and disconnect electrical ground power unit

(3) Disconnect air supply unit from ice sensor transducer and connect duct located upstream of ice sensor grille

(4) Make certain that area around ice sensor transducer is clean and clear of tools and miscellaneous items of equipment

R (5) Close access door :

R 534ET for group 1 ice sensor transducer
R B 533FT for group 2 ice sensor transducer NOT FITTED CM
R B 633FT for group 3 ice sensor transducer 21C012 Refers
R 634ET for group 4 ice sensor transducer

(6) Remove access platform

(7) Remove shunt from ambient pressure switch H1032 corresponding to ice sensor transducer tested

(8) Connect ambient pressure switch electrical connector

(9) Close access door 123AB or 123BB

(10) Make certain that working area is clean and clear of tools and miscellaneous items of equipment

COLD AIR UNIT OUTLET ICE SENSOR GRILLE - REMOVAL/INSTALLATION

R 1. General

R B The removal/installation procedure is identical for each ice
R B sensor grille, for groups 1 and 4 only.

2. Ice Sensor Grille

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform	
Wing Protective Mats	
Circuit Breaker Safety Clips	
Electrical Ground Power Unit	
Ground Air Supply Unit - Minimum Relative Pressure : 2 Bars Minimum Airflow : 0.4 Kg/s - Maximum Relative Pressure : 4.5 bars Maximum Airflow 0.6 Kg/s	
(The temperature must not exceed 300°C)	

B. Prepare

R (1) Trip, safety and tag one of the following circuit
R breakers :
R

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R R R				
R R	GRP 1 ICE DETECTOR SENSOR SUP	15-215	H 995	D 4
R R B	GRP 2 ICE DETECTOR SENSOR SUP	15-216	H 996 INOPERATIVE	D24
R R B	GRP 3 ICE DETECTOR SENSOR SUP	15-215	H 997 INOPERATIVE	E 4
R	GRP 4 ICE DETECTOR	15-216	H 998	E23

R

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SENSOR SUP			

R R R R (2) Open access door
R 534ET and 536AT for group 1
R B 533FT and 535AT for group 2 Grilles removed from groups
R B 633FT and 635AT for group 3 2 and 3 CM21C012 refers.
R 634ET and 636AT for group 4

R (3) Position the wing protective mats.

R C. Remove (Ref. Fig. 401)

(1) Remove duct (1).

(a) Disconnect electrical connector (2).

(b) Remove insulation sleeve (9).

(c) Disconnect bonding strip (5).

(d) Remove clamp (10).

(e) Remove pipe union (6).

(f) Remove swivel joint (3) (Ref. 21-00-00, Page Block 401).

(g) Remove cotter pin, and hinge pin (8) securing the duct on its support.

(h) Remove duct (1).

R B (2) Remove ice sensor grille. (Groups 1 and 4 only)

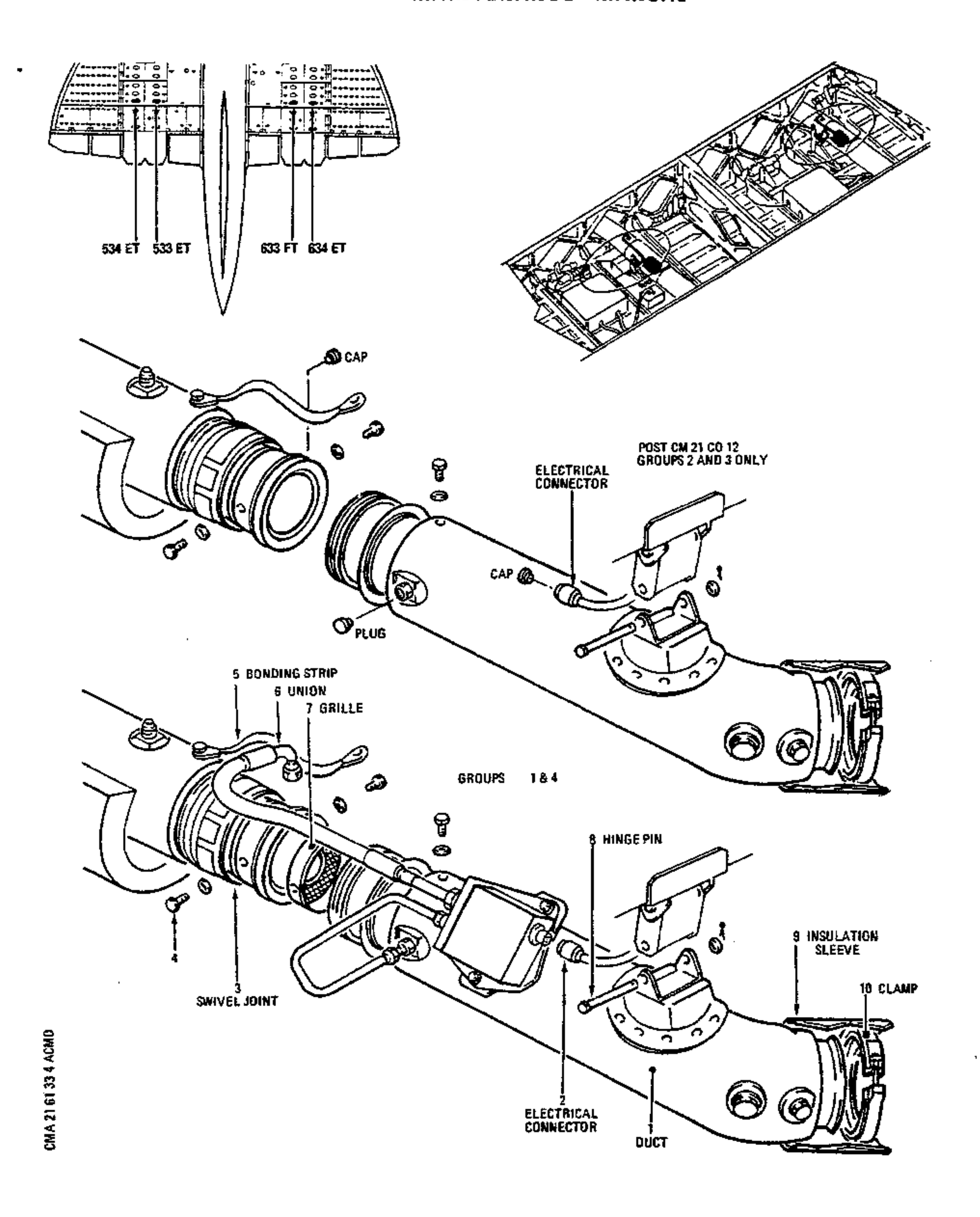
R B (a) Unscrew the two mounting bolts (4) from the grille
R B retain washers.

R B (b) Remove grille (7).

R B D. Install (Groups 1 and 4 only)
(1) Install replacement grille.

(a) Install grille (7) in its location.

(b) Install bolts (4) together with their washers.



Ice Sensor Grille
Figure 401

B

R

(2) Install duct (1).

(a) Install pipe, then hinge pin (8) and secure with cotter pin.

(b) Install and tighten clamp (10).

(c) Connect bonding strip (5).

(d) Install insulation sleeve (9).

(e) Install swivel joint (3) (Ref. 21-00-00, Page Block 401).

(f) Install union (6).

(g) Connect electrical connector (2).

B E. Deleted

F. Close-Up

(1) Disconnect the ground air supply unit.

(2) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2 E (1) (g) and 2 B (1).

(3) Restore fuel system to normal operating condition.

(4) If necessary, remove safety clip and tag and reset the landing gear circuit breaker.

(5) De-energize the aircraft electrical network and disconnect the electrical ground power unit.

(6) Close access doors and remove protective mats.

COLD AIR UNIT OUTLET TEMPERATURE SENSOR - REMOVAL/INSTALLATION

1. General

The removal/installation procedure of temperature sensors 1 (2, 3, 4) D166 is identical for each group.

2. Temperature Sensor

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform	
Lockwire 0.7 mm (0.025 inch.)	
Circuit Breaker Safety Clip	

B. Prepare

(1) Open access doors

535 AT for group 1 temperature Sensor
542 AB for group 2 temperature Sensor
642 AB for group 3 temperature Sensor
635 AT for group 4 temperature Sensor

(2) Trip, safety and tag one of the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1 GRP1 CAU/DUCT TEMP IND	1-213	1D 162	E11
Group 2 GRP2 CAU/DUCT TEMP IND	5-213	2D 162	D 9
Group 3 GRP3 CAU/DUCT TEMP IND	15-215	3D 162	C 4
Group 4 GRP4 CAU/DUCT TEMP IND	15-216	4D 162	C23

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1)

(2) Remove lockwire

(3) Remove temperature sensor (2).

D. Install

(1) Check condition of seal and screw temperature sensor (2)

(2) Wirelock temperature sensor

(3) Install electrical connector (1).

E. Test

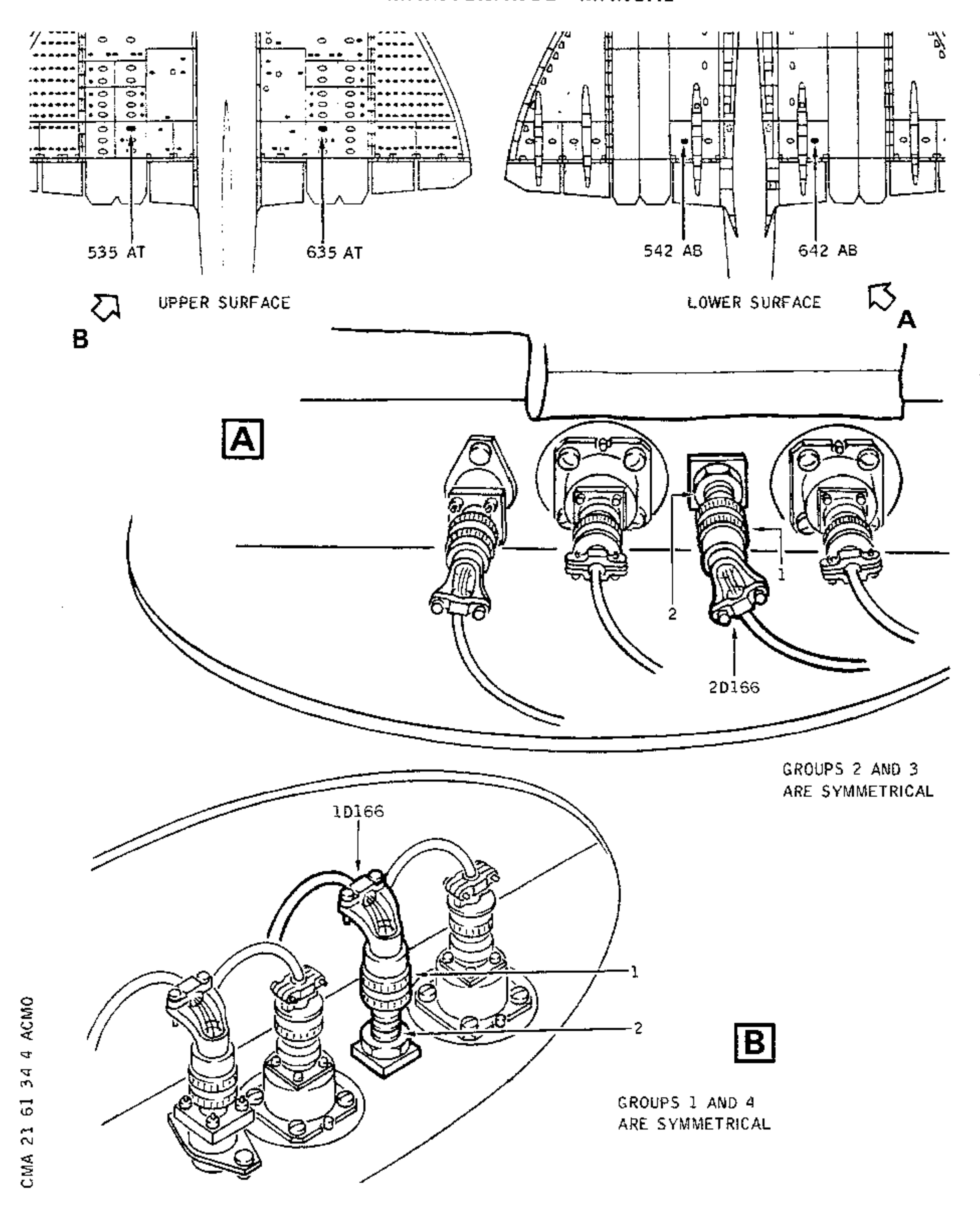
(1) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2. B. (2).

B (2) Check for correct operation by comparison with tempe-
B rature indicators of other groups.

F. Close-Up

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment. Close access doors opened in paragraph 2.B.(1).



R

Cold Air Unit Temperature Sensor
Figure 401

WING MINI-MAXI TEMPERATURE SENSOR - REMOVAL/INSTALLATION

1. General

R The removal/installation procedure is identical for
R each group temperature sensors 41048, 41049, 41050, 41051.

2. Temperature sensor

A. Equipment and Materials.

DESCRIPTION	PART NO.
Access Platform	
Circuit breaker Safety Clips	

B. Prepare

R (1) Open access doors

R 535 AT for group 1 temperature sensor
R 542 AB for group 2 temperature sensor
R 642 AB for group 3 temperature sensor
R 635 AT for group 4 temperature sensor

(2) Trip safety and tag the following circuit breakers.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1 GR1 TEMP SELECTOR AUTO SUP & CONT	2=213	H1000	
Group 2 GR2 TEMP SELECTOR AUTO SUP & CONT	4-213	H1001	E11
Group 3 GR3 TEMP SELECTOR AUTO SUP & CONT	2-213	H1002	G16
Group 4 GR4 TEMP SELECTOR AUTO SUP & CONT	4-213	H1003	B12

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1)

(2) Remove screws (2)

(3) Remove temperature Sensor (3)

D. Install

(1) Install temperature sensor (3)

(2) Install screws (2)

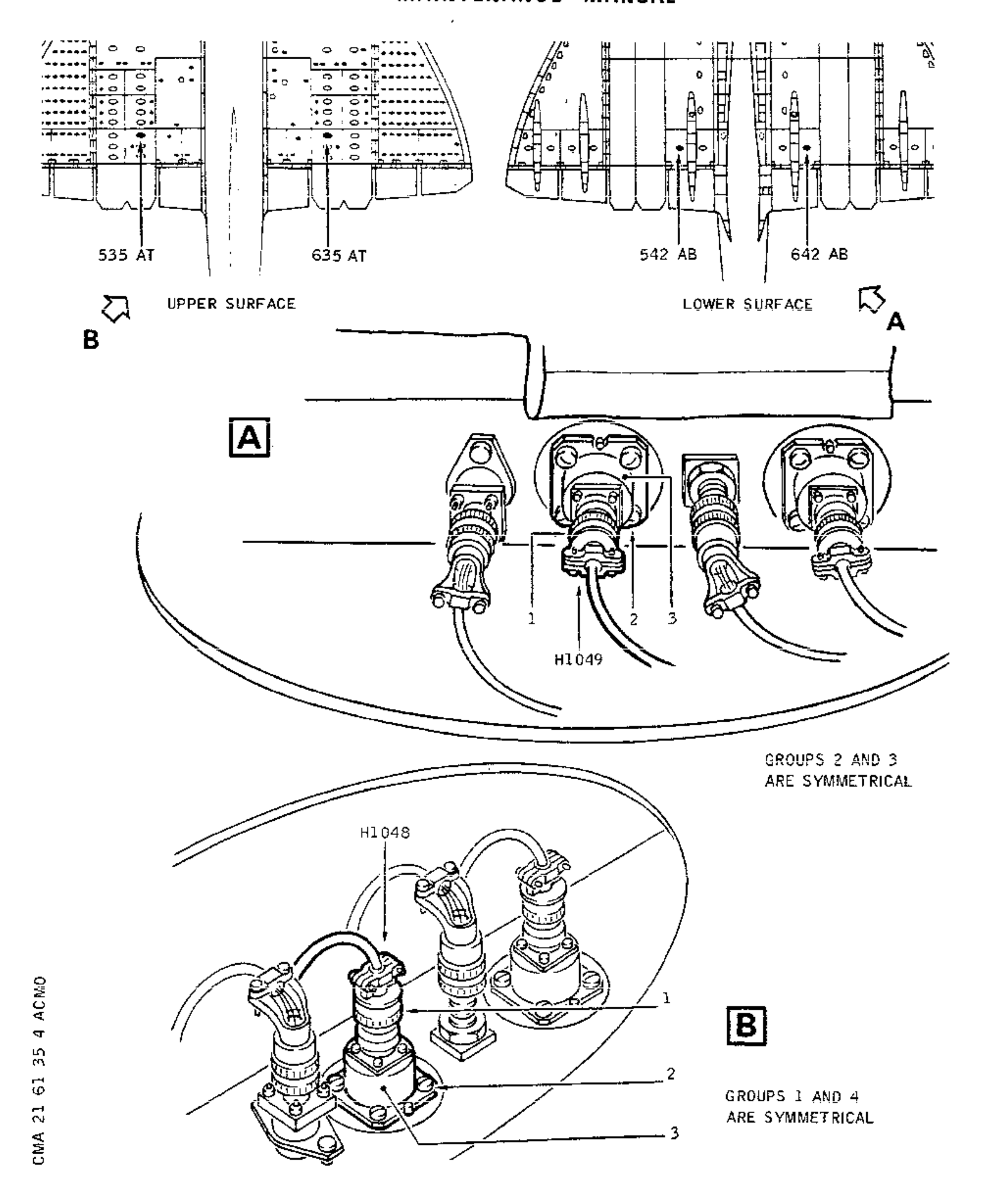
(3) Connect electrical connector (1)

E. Close Up

(1) Close access doors

(2) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2 B (2).

B F. Deleted



R

Wing Mini-Maxi Temperature Sensor
Figure 401

SEMI-AUTOMATIC TEMPERATURE SENSOR - REMOVAL/INSTALLATION

1. General

R The removal/installation procedure of temperature sensors
R H1064, H1065, H1066, H1067 is identical for each group.

2. Temperature Sensor

A. Equipment and Materials.

DESCRIPTION	PART NO.
Access Platform	
Circuit Breaker Safety Clips	

B. Prepare

R (1) Open access doors

R 535 AT for group 1 temperature sensor
R 542 AT for group 2 temperature sensor
R 642 AT for group 3 temperature sensor

(2) Trip safety and tag the following circuit breakers.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1			
GR1 TEMP SELECTOR MANL SUP & CONT	1-213	H 991	E11
GR1 TEMP SELECTOR AUTO SUP & CONT	2-213	H1000	B17
Group 2			
GR2 TEMP SELECTOR MANL SUP & CONT	5-213	H 992	B 8
GR2 TEMP SELECTOR AUTO SUP & CONT	4-213	H1001	E11
Group 3			
GR3 TEMP SELECTOR MANL SUP 8 CONT	15-215	H 993	B3

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GR3 TEMP SELECTOR AUTO SUP 8 CONT	2-213	H1002	G16
Group 4			
GR4 TEMP SELECTOR MANL SUP & CONT	15-216	H 994	C24
GR4 TEMP SELECTOR AUTO SUP & CONT	4-213	H1003	B12

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1)

(2) Remove screws (2)

(3) Remove temperature sensor (3)

D. Install

(1) Install temperature sensor (3)

(2) Install screws (2)

(3) Connect electrical connector (1)

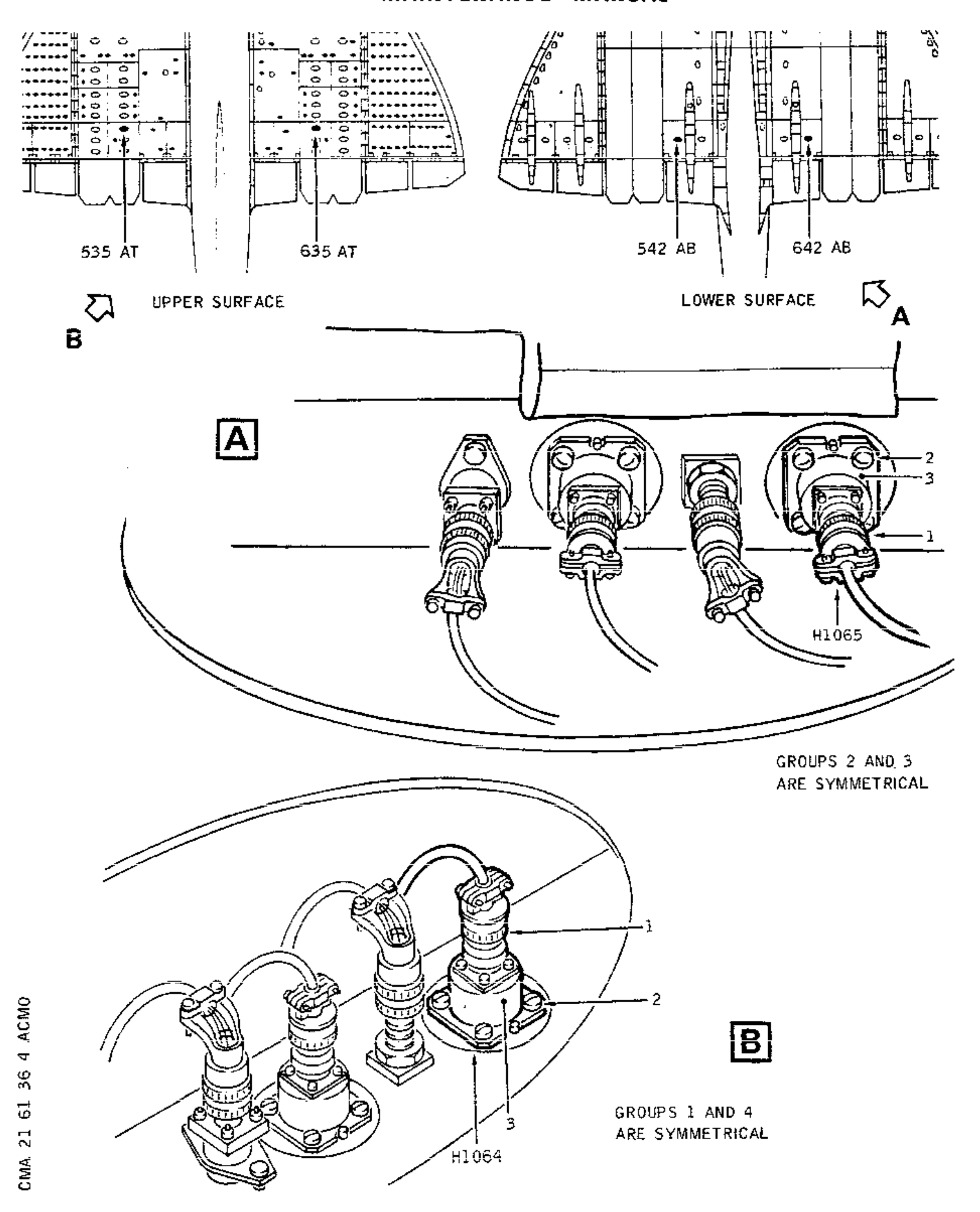
E. Close Up

(1) Close access doors

(2) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2 B (2).

B F. Deleted

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R

Semi-Automatic Temperature Sensor
Figure 401

COLD AIR UNIT INLET TEMPERATURE SENSOR - REMOVAL/INSTALLATION

1. General

The removal/installation procedure is identical for the tempe-
R rature sensor of each group.

2. Cold Air Unit Temperature Sensor

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform	
Lockwire 0,7 mm (0.027 inch.)	
Circuit Breaker Safety Clips	

B. Prepare

(1) Open access doors :

534 BT for group 1 temperature sensor
533 AT for group 2 temperature sensor
633 AT for group 3 temperature sensor
634 BT for group 4 temperature sensor

R (2) Trip safety and tag one of the following circuit
R breakers

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 1 GRP1 CAU/PUCT TEMP IND	1-213	1D 162	E11
Group 2 GRP2 CAU/DUCT TEMP IND	5-213	2D 162	D 9
Group 3 GRP3 CAU/DUCT TEMP IND	15-215	3D 162	C 4
Group 4 GRP4 CAU/DUCT TEMP IND	15-216	4D 162	C23

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C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1)

(2) Remove lockwire ; unscrew temperature sensor (2) and remove it.

D. Install

(1) Check condition of seal and screw temperature sensor (3); wirelock

(2) Install electrical connector (1).

E. Test

B (2) Check for correct operation by comparison with
B indicators of other groups.

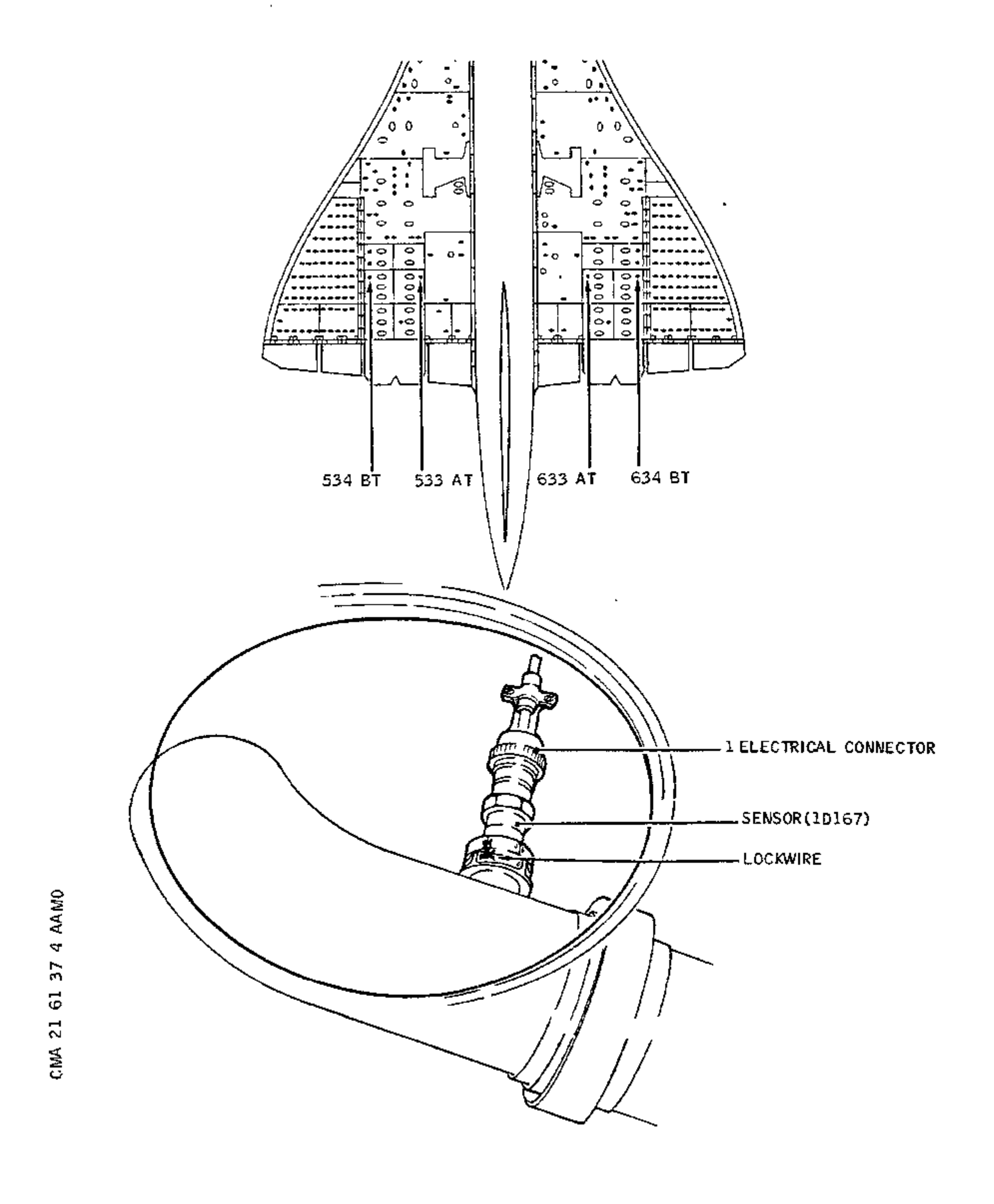
(3) On TEMPERATURE CONTROL panel 2-214, check that temperature increases on CAU IN temperature indicator.

(4) Again, refer to 21-61-31 and carry out the procedure described in paragraphs 2 C (10) and 2 D.

F. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) Close access doors opened in paragraph 2 B (1).



COLD AIR UNIT INLET TEMPERATURE SENSOR
Figure 401

R

FORWARD CABIN TEMPERATURE CONTROL
DESCRIPTION AND OPERATION

1. General

Air conditioning of the forward cabin is provided in normal operation by air conditioning group 2.
The function of the temperature control system is to provide a forward cabin temperature which varies between 15° and 30°C. The temperature control system achieves this by :

- limiting air temperature in the air duct, downstream of the cold air unit turbine,
- limiting air temperature in the forward cabin distribution duct,
- enabling the duct to be de-iced, if necessary, downstream of the Cold Air Unit (above 30,000 ft altitude only),
- enabling air temperature downstream of the Cold Air Unit to be manually controlled in the event of failure of the group automatic temperature control.

2. Description (Ref. Fig. 001)

A. The forward cabin temperature control system comprises the following main components :

(1) Temperature control valve (H1037)

(2) Temperature control valve position indicator (H1016)

(3) Temperature controller (H1024)

(4) Comparison unit (H1027)

(5) Temperature selector (H1020)

(6) Cold Air Unit outlet ice sensor transducer (H1053)

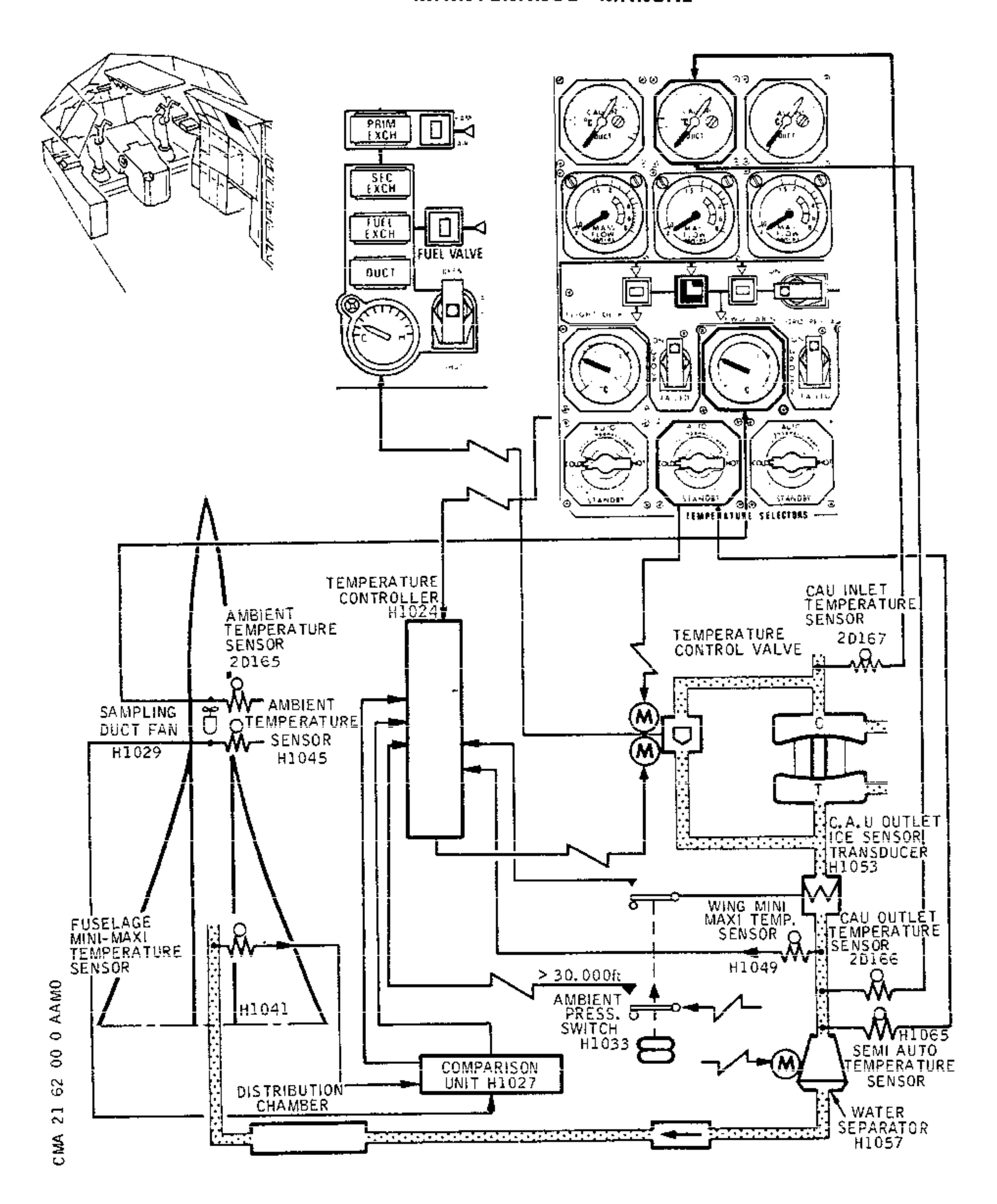
(7) Ambient pressure switch (H1033)

(8) Four temperature sensors (H1041) (H1045) (H1049) (H1065)

(9) Ambient temperature indicator (2D163)

(10) Dual air conditioning temperature indicator (2D164).

(11) Three temperature sensors associated with indicators (9), (10).



Forward Cabin Temperature Control - Schematic
Figure 001

(12) Sampling duct fan (1029).

3. Valve - Temperature Control

A. This valve is structurally and functionally identical with the flight compartment temperature control valve (Ref. 21-61-00, Description and Operation).
Located on a Cold Air Unit outlet branch, it is reached through access door 533DT.

4. Indicator - Temperature Control Valve Position

A. This indicator, located on panel 2-214 is identical with that on the flight compartment temperature control valve position indicator (Ref. 21-61-00, Description and Operation).

5. Controller - Temperature (Ref. Fig. 002)

A. Description

Located in the electronics rack 1-215, this electronic unit is identical with the flight compartment temperature controller (Ref. 21-61-00, Description and Operation).

B. Operation

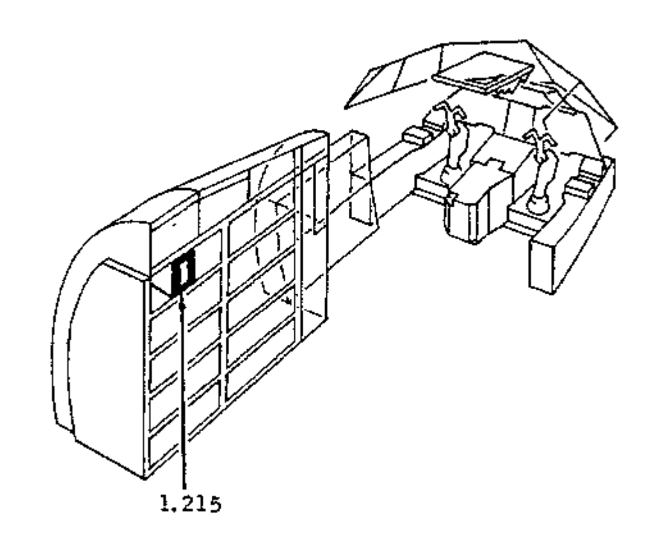
Any variation between the required forward cabin temperature (selected on group 2 temperature selector) and the true temperature indicated by the ambient temperature sensor, produces an error signal.

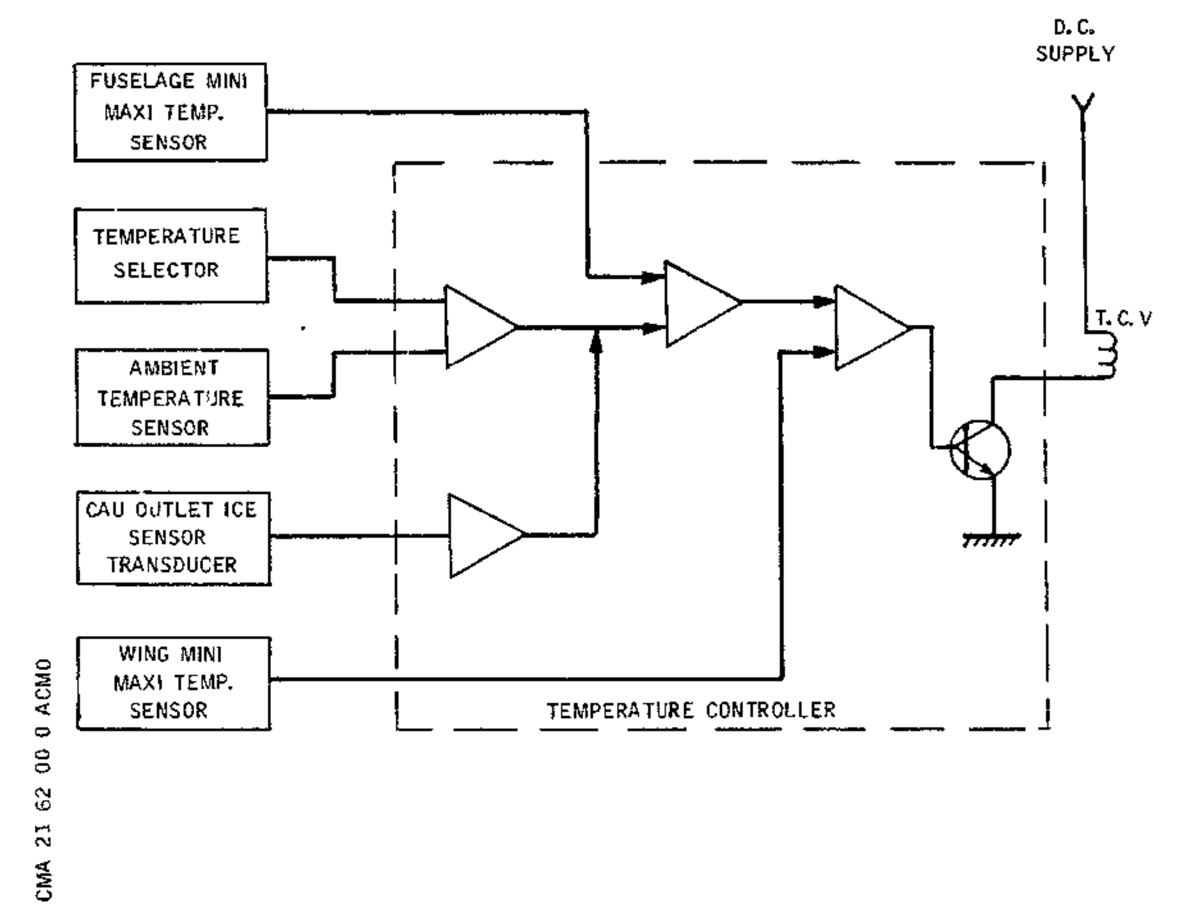
Depending on the air temperature in the mixing and delivery ducts, this signal is modified within the temperature controller.
Furthermore, where icing is detected in the mixing duct, the signal level is increased until the icing disappears (effective above 30,000 ft).
The resulting signal is fed to the temperature control valve torque motor (automatic operation), and the valve opens or closes according to the temperature required.

NOTE : The temperature controller operates only in automatic mode (temperature selector in AUTO position).
The temperature controller is used for temperature control of the flight compartment, in the event of failure of its air conditioning system.

6. Comparison Unit (Ref. Fig. 003)

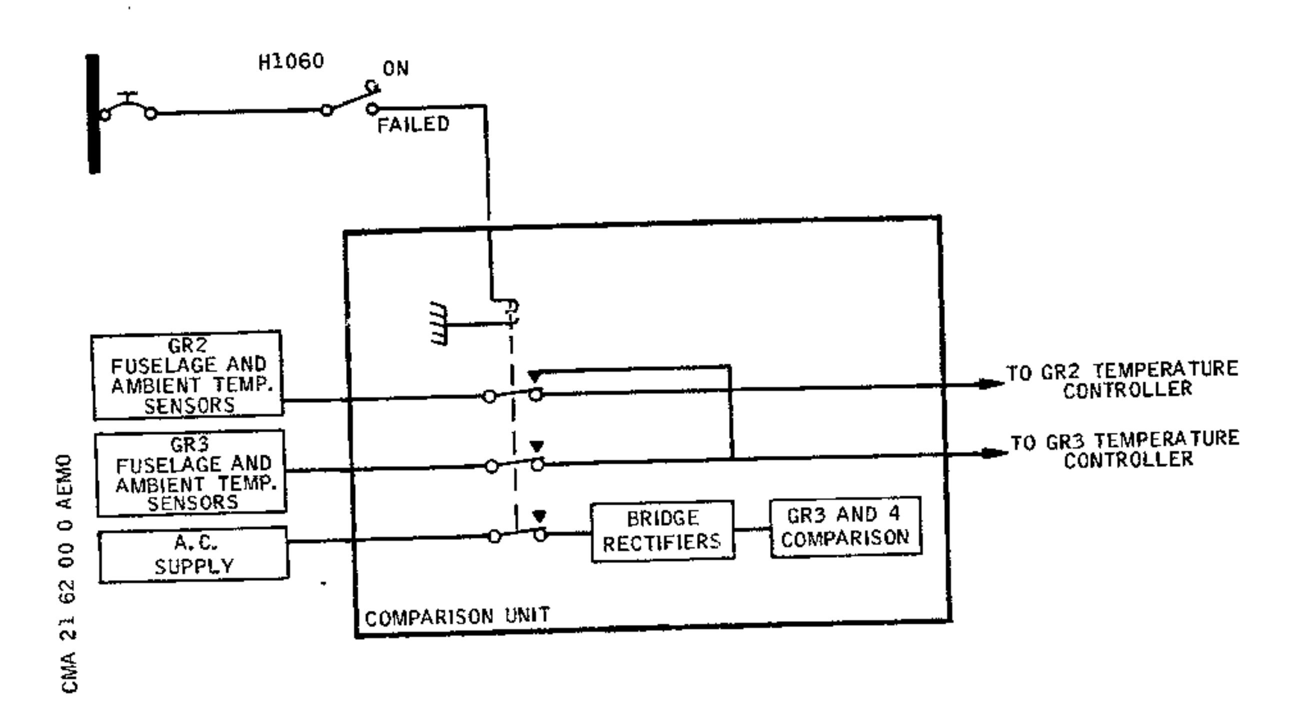
A. Description





CMA 21 62 00 0 ACMO

Temperature Controller
Figure 002



Group 2 Section of Comparison Unit - Schematic
Figure 003

(Ref. 21-61-00, Description and Operation).

B. Operation

In normal operation, with air conditioning group 2 supplying the forward cabin, group 2 switch H1060 is in ON position signals from the ambient temperature sensors (H1045) and fuselage mini-maxi temperature sensors (H1041) are sent via the comparison unit to the group 2 temperature controller.

The electrical power supply 115V-400 Hz is transformed to supply the comparison system between groups 3 and 4.

In the event of failure of air conditioning group 2, group 2 switch (H1060) must be placed in FAILED position (in addition to closing of group 2 valves).

This enables the comparison unit relays to be energized.

Signals from the ambient temperature sensors (H1045) and

fuselage mini-maxi temperature sensors (H1041) in the front of the cabin are then sent to group 3 temperature controller, which provides air conditioning of the forward cabin.

The group 3 control sensors are then isolated and the electrical supply to the comparison circuit between groups 3 and 4 is cut off.

NOTE : When the forward cabin air conditioning is manually regulated (group 2 temperature selector is then in STANDBY position) the part of the comparison unit concerned with group 2 is isolated.

7. Selector - Temperature

Located on panel 2-214 this temperature selector is identical in description and operation with that of group 1 (Ref. 21-61-00, Description and Operation).

In STANDBY mode, the group 2 temperature selector operates in conjunction with the semi-automatic temperature sensor H1065.

8. Transducer - Cold Air Unit Outlet Ice Sensor

This ice sensor transducer is located in the wing, on the air conditioning duct downstream of the CAU and is identical with that of group 1 (Ref. 21-61-00, Description and Operation).

9. Pressure Switch - Ambient

The group 2 ambient pressure switch is located in the cargo compartment between FR15 and 16.

It is accessible through access door 123BB and is identical with that of group 1 (Ref. 21-61-00, Description and Operation).

10. Sensors - Temperature

Four identical sensors are used for the forward cabin temperature control :

- The semi-automatic temperature sensor H1065 is used in manual mode, or STANDBY (with temperature selector in STANDBY position). It is located in the wing air conditioning duct,
- The wing mini-maxi temperature sensor (H1049) is located in the wing air conditioning duct,
- The fuselage mini-maxi temperature sensor (H1041) is located in the duct downstream of the distribution chamber,
- The ambient temperature sensor (H1045) is located in the duct between FR32 and FR34, accessible through the LH

hatrack.
The three remaining sensors are used for automatic temperature control.

Their description and operation is dealt with in Flight Compartment Temperature Control (Ref. 21-61-00, Description and Operation).

11. Indicator - Ambient Temperature

The cabin ambient temperature indicator (FWD CABIN) located on Flight Engineer's panel 2-214, monitors the forward cabin temperature.

Its description and operation is identical with that of the flight compartment ambient temperature indicator (Ref. 21-61-00, Description and Operation).

12. Indicator - Dual Air Conditioning Temperature

The dual air conditioning temperature indicator (2D164) is located on Flight Engineer's panel 2-214, and monitors conditioned air temperature at the cold air unit inlet and outlet.

The description and operation is identical with that of the flight compartment dual air conditioning temperature indicator (Ref. 21-61-00, Description and Operation).

The lower scale indicates the air outlet temperature downstream of the cold air unit (sensor 2D166) and the upper scale the cold air unit inlet temperature (sensor 2D167).

13. Sensors - Temperature

The forward cabin temperature control system includes three temperature sensors :

- The ambient temperature sensor (2D165) is located in LH hatrack duct between FR32 and FR34.

It transmits conditioned air temperature to the ambient temperature indicator (2D163)

- The cold air unit outlet temperature sensor (2D166) and cold air unit inlet temperature sensor (2D167) transmits these temperatures to the dual air conditioning temperature indicator (2D164).

Description and operation procedure for these sensors is identical with that for flight compartment temperature sensors (Chap. 21-61-00, Description and Operation).

14. Fan - Sampling Duct (Ref. Fig. 004)

The forward cabin sampling duct fan (H1029) ventilates the duct in which the ambient temperature sensors (H1045 and 2D165) measuring the forward cabin temperature are located.

Positioned between FR32 and 34 in the duct, it is accessible through the LH hatrack.

The fan description and operation are described in Chapter 21-61-00, Description and Operation.

15. Operation

A. Normal Operation (Automatic Mode) (Ref. Fig. 005)

The normal operation of the forward cabin temperature control is automatic, the conditioned air being bled from group 2.

The temperature selector having been placed in one of the positions in the AUTO range, wafer A switches 115 volts 400 Hz to the temperature controller wafer B switches the necessary resistances, according to the temperature of the forward cabin.

The resulting signal is compared with the signal from the ambient temperature sensor (H1045) and any difference is amplified by temperature controller amplifier A1.

This signal is modified in the temperature controller by the addition of various signals from either of the following sources :

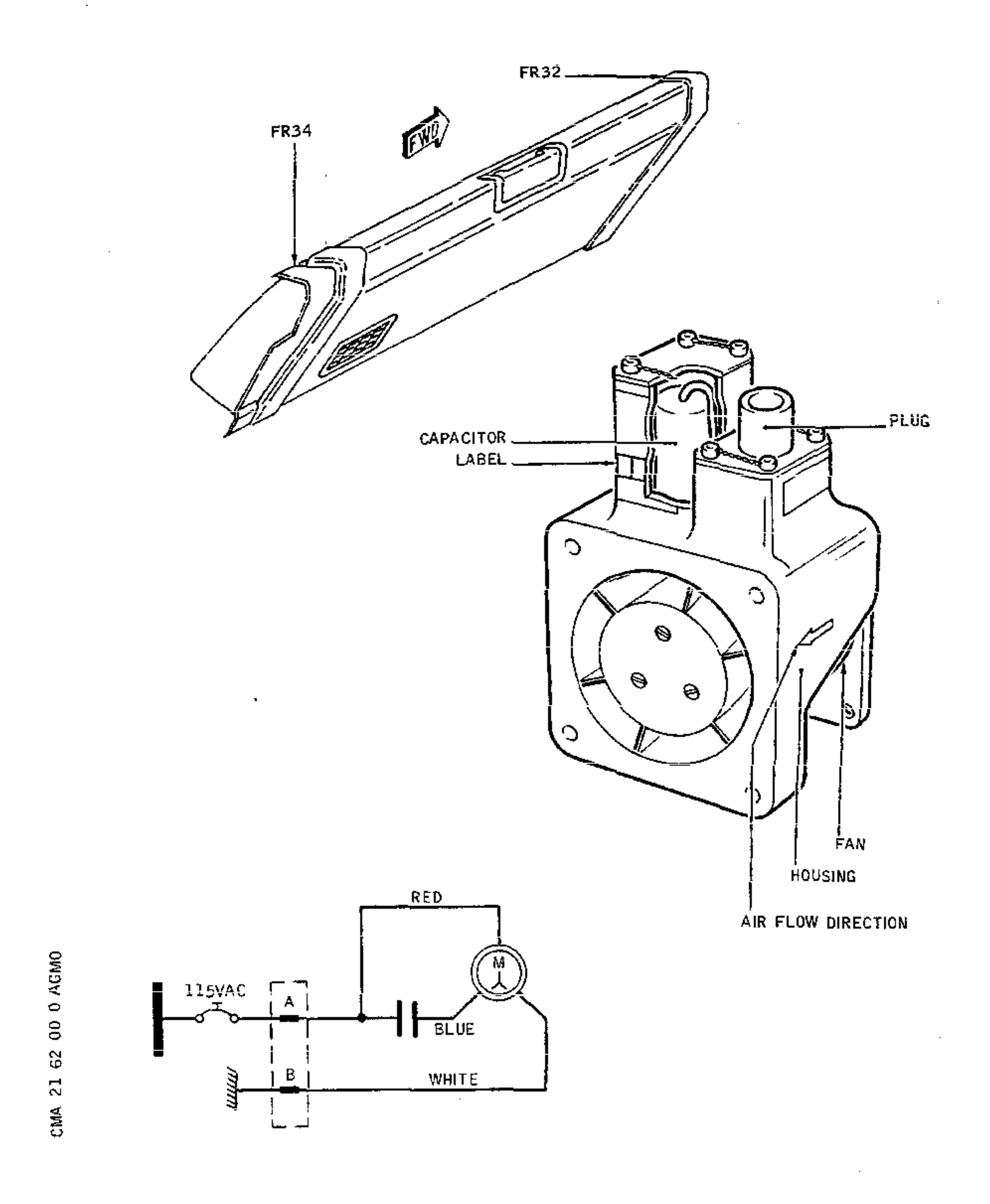
- The fuselage mini-maxi temperature sensor (H1041),
- The wing mini-maxi temperature sensor (H1049).

The error signal, amplified by the temperature controller amplifier A2, is fed to the torque motor controlling the temperature control valve until the variation between the required and true temperature is brought back to zero.

The ambient pressure switch (H1033) controls relay 2H910, which ensures :

- Above 30,000 ft :
  - mixed air temperature control included between + 5°C and +80°C.

- Below 30,000 ft :
  - mixed air temperature control included between



Sampling Duct Fan
Figure 004

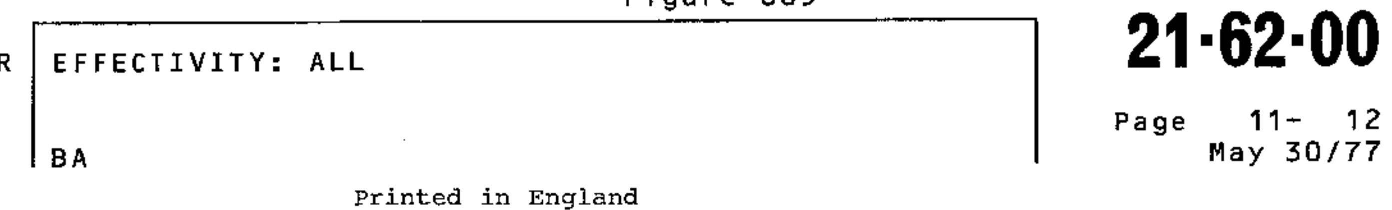
INTENTIONALLY BLANK

LETTERS IN A CIRCLE INDICATE TEST POINTS

TEMPERATURE SELECTOR
COLD
HOT
AUTO
H1020
115V
400HZ
H1001
2H901
LOCKING RELAY
WING MINI MAXI TEMP. SENSOR
H1049
FUSELAGE MINI MAXI TEMP. SENSOR
H1041
AMBIENT TEMP. SENSOR
H1045
COMPARISON UNIT
H1027
OPEN CIRCUIT - 10°c
GROUNDED - 2°C
C.A.U OUTLET ICE SENSOR TRANSDUCER
H1053
H1033
Z > 30 000ft
Z < 30 000ft
AMBIENT PRESS. SWITCH
2H910
+ 28V
TO TEMPERATURE CONTROL UNIT.
OPEN CIRCUIT -30°C
GROUNDED +5°C
BLOWING
MIXING
TEMPERATURE CONTROLLER
H1024
TEMP. CONTROL VALVE
AUTOMATIC TORQUE MOTOR
H1037

CMA 21 62 00 0 AJMO

Forward Cabin - Temperature Control
Auto Mode Operation
Figure 005



R EFFECTIVITY: ALL

BA

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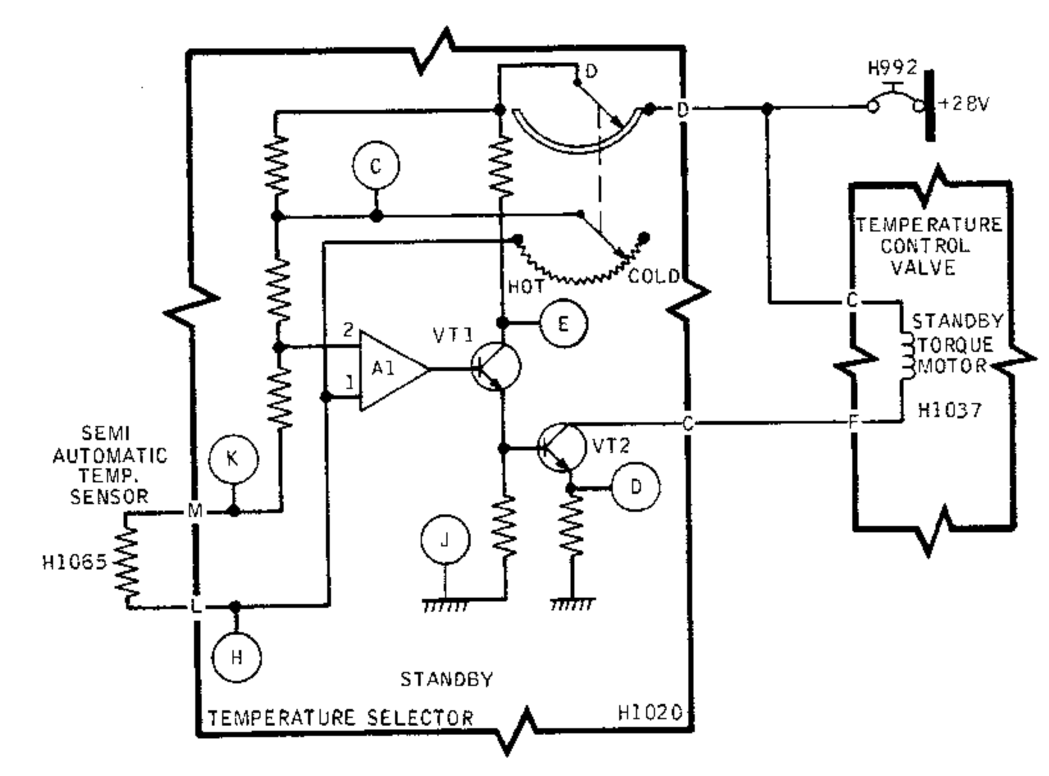
- 30°C and +80°C.

- A signal is sent to amplifier A51 when ice is detected in the mixing duct, until the ice disappears.

The comparison unit relay D3 is, moreover, normally de-energized.
The temperature control downstream of the amplifier A1 is ensured in the range between - 10°C and + 35°C.

Relay D3 is only activated in the case of group 1 failure, when flight compartment temperature control is provided by the group 2 temperature controller. The control range is then between -2°C and +35°C.

B. Manual Mode Operation (STANDBY) (Ref. Fig. 006)



Forward Cabin Temperature Control
STANDBY Mode Operation
Figure 006

If the automatic control does not work, the forward cabin temperature control can be carried out in automatic or STANDBY mode.

The temperature selector then has to be placed in one of the STANDBY range positions. This has the effect of :

- Cutting off the 115V 400 Hz supply to the temperature controller, which is then disconnected,
- Switching the 28V supply to the temperature selector STANDBY circuit,
- Switching a resistance in the selector to the input to amplifier A1,
- Activating the semi-automatic temperature control sensor (H1065).

Any variation between the required mixed air temperature and the true temperature in the duct (semi-automatic temperature control sensor H1065) results in a difference of voltage at the input to amplifier A1.

The output signal controls the switch-on of transistor VT2.

The temperature control valve is then activated by its manual control motor (STANDBY operation) until the temperature variation is brought back to zero.

C. Group 2 Air Conditioning System Failure (Ref. Fig.007 and 008)

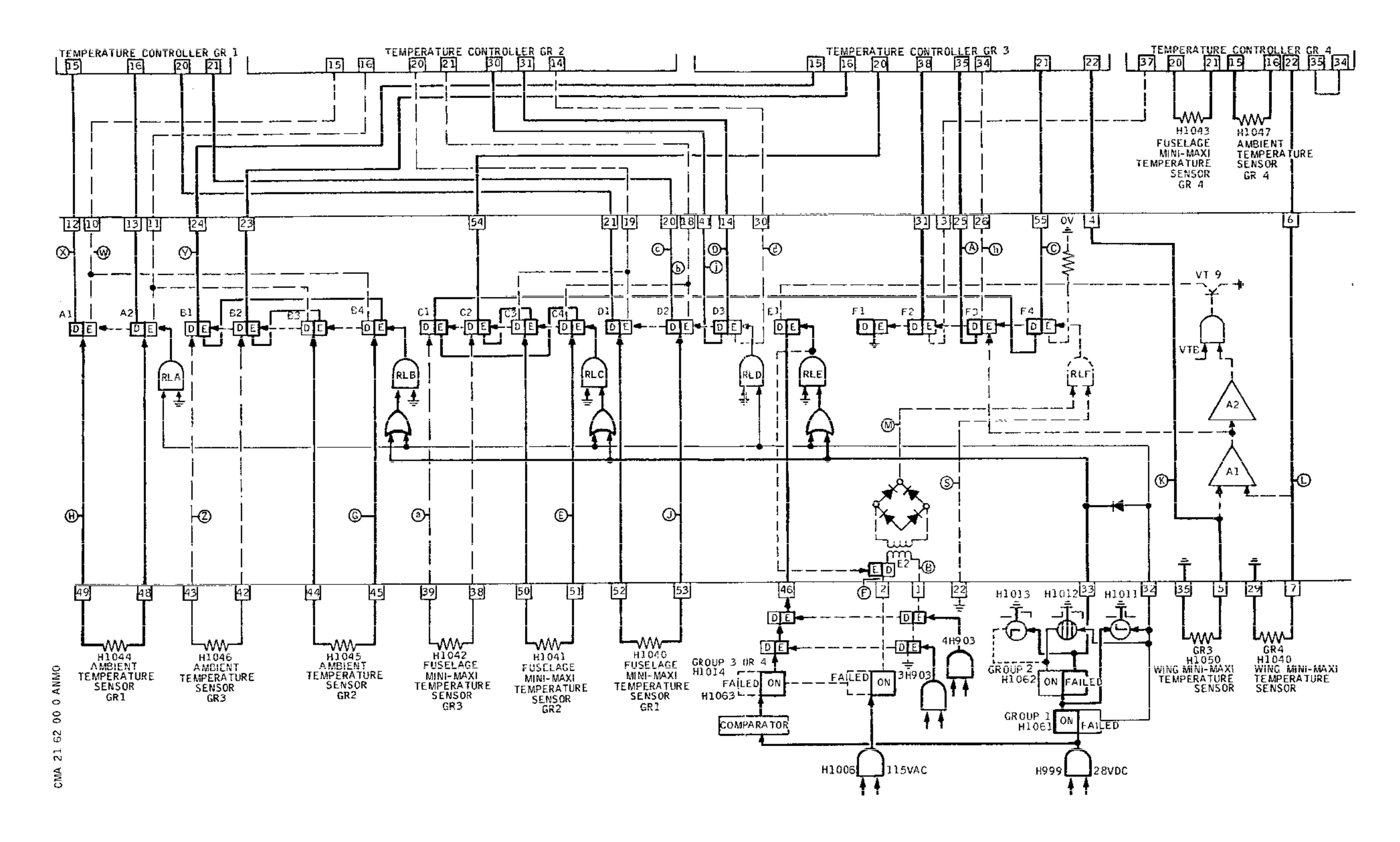
(1) Operation

In the event of a failure of the forward cabin air conditioning system due to a failure of a component located between the air conditioning valve and cabin isolation valve, bleed air from engine 1 is not obtainable by using the cross bleed valve.
Group 2 is thus out of action.
It is then necessary, on panel 2-214 :

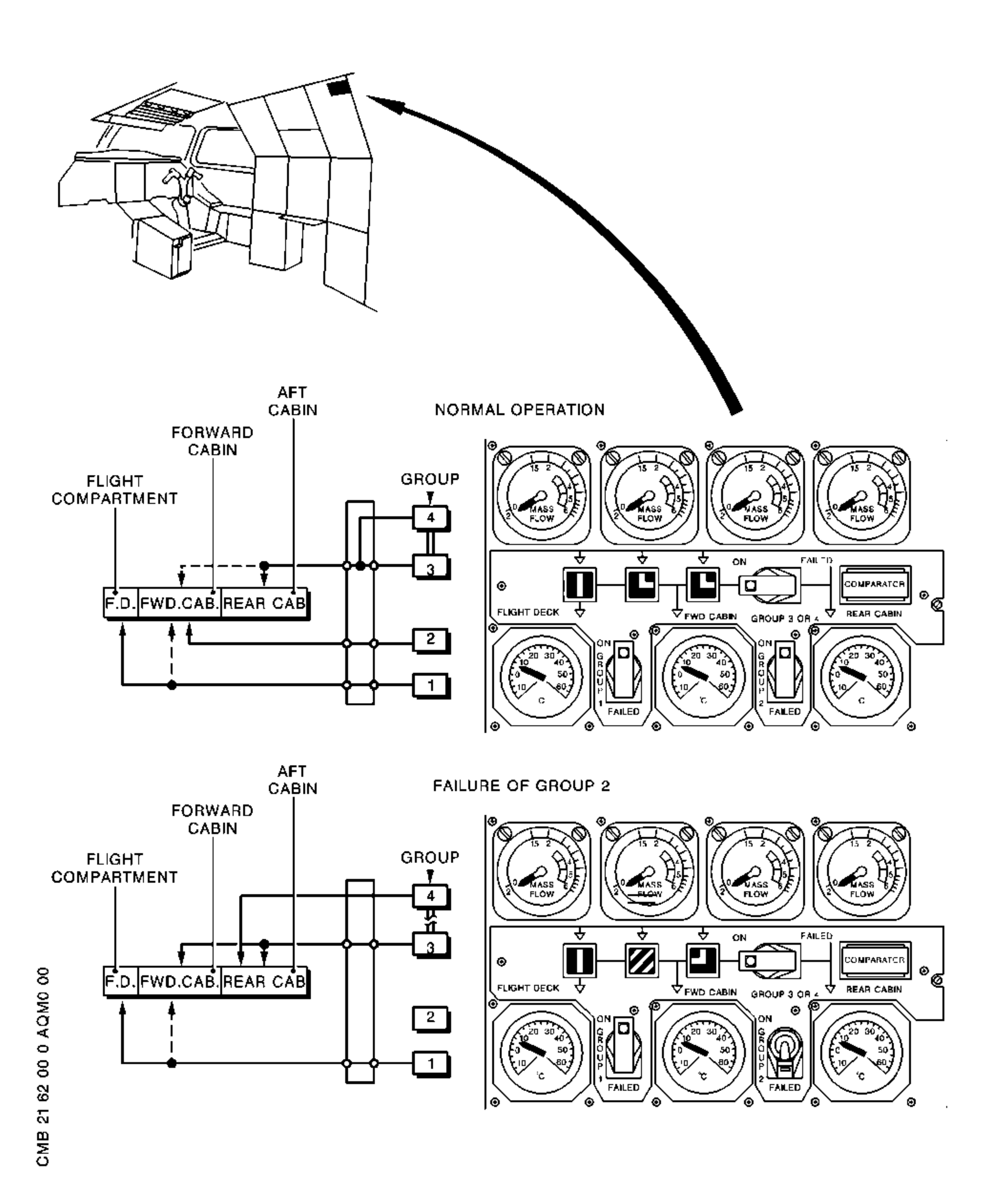
- To place BLEED VALVES ENG 2 switch in SHUT position, and COND VALVE ENG 2 switch in OFF position, in order to de-activate group 2
- To place group 2 temperature selector in COLD position
- To place GROUP 2 switch in FAILED position.

This last operation energizes various relays in the comparison unit, resulting in :

- De-activation of group 2 temperature controller
- Signals from group 2 ambient temperature sensor (H1045) and fuselage mini-maxi temperature sensor (H1041) being sent to group 3 temperature controller



Group 2 Failure Switching
Figure 007



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Indicating System
Figure 008

- Disconnection of group 3 and 4 control signals
- Cutting off signals from group 3 ambient temperature sensor (H1046) and fuselage mini-maxi temperature sensor (H1042).

Thus, the following normal operation of the aircraft temperature control:

	Air cond. from	Sensors	Temperature Controller	Temperature Selector
Flight compartment	GR1	GR1	GR1	No.1 (GR1)
FWD cabin	GR2	GR2	GR2	No.2 (GR2)
AFT cabin	GR3 & 4	GR3 & 4	GR3 & 4	No.3 (GR3) & No.4 (GR4)

changes, after group 2 is out of action, to:

	Air cond. from	Sensors	Temperature Controller	Temperature Selector
Flight compartment	GR1	GR1	GR1	No.1 (GR1)
FWD cabin	GR3	GR2	GR3	No.3 (GR3)
AFT cabin	GR4	GR4	GR4	No.4 (GR4)

Forward cabin temperature is then controlled by group 3, temperature controller from engine 3 bleed system.

(2) Indication

Air delivery distribution is displayed by the magnetic indicators on panel 2-214, according to whether the 4 groups are operating normally or whether the forward cabin air conditioning system is defective.

FORWARD CABIN TEMPERATURE CONTROL - INSPECTION/CHECK

1. Sampling Duct Fan Screen

A. Inspection/Check

(1) Make certain that the screen is clean. Clean if necessary.

R (2) Open LH hatrack between Frames 32 and 34.

(3) On upper part of sampling duct fan protective cover, make certain that screen is clean and free from dust.

(4) If screen is clogged, clean it with a clean, dry and soft brush.

(5) Clean the inside of the hatrack if necessary.

(6) Close hatrack.

AMBIENT PRESSURE SWITCH - REMOVAL/INSTALLATION

1. General

Removal/installation procedure for the ambient pressure switch H1033 is dealt with in : 21-61-11, R/I.

AMBIENT PRESSURE SWITCH - ADJUSTMENT/TEST

1. General

The test of ambient pressure switch H1033 is dealt with in :

21-61-11, A/T

AMBIENT TEMPERATURE SENSOR - REMOVAL/INSTALLATION

1. General

A. The ambient temperature sensor 2D165 is located in LH hatrack forward of frame 30.

2. Ambient Temperature Sensor (Ref. Fig. 401)

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	-
Electrical Ground Power Unit	-
Thermometer (degrees centigrade)	-

B. Prepare

(1) Trip, safety and tag the following circuit breaker

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FWD CABIN TEMP IND	5-213	2D 161	D 8

(2) Open LH hatrack.

(3) Unscrew the 3 screws (1) attaching sensor cover (2).

C. Remove

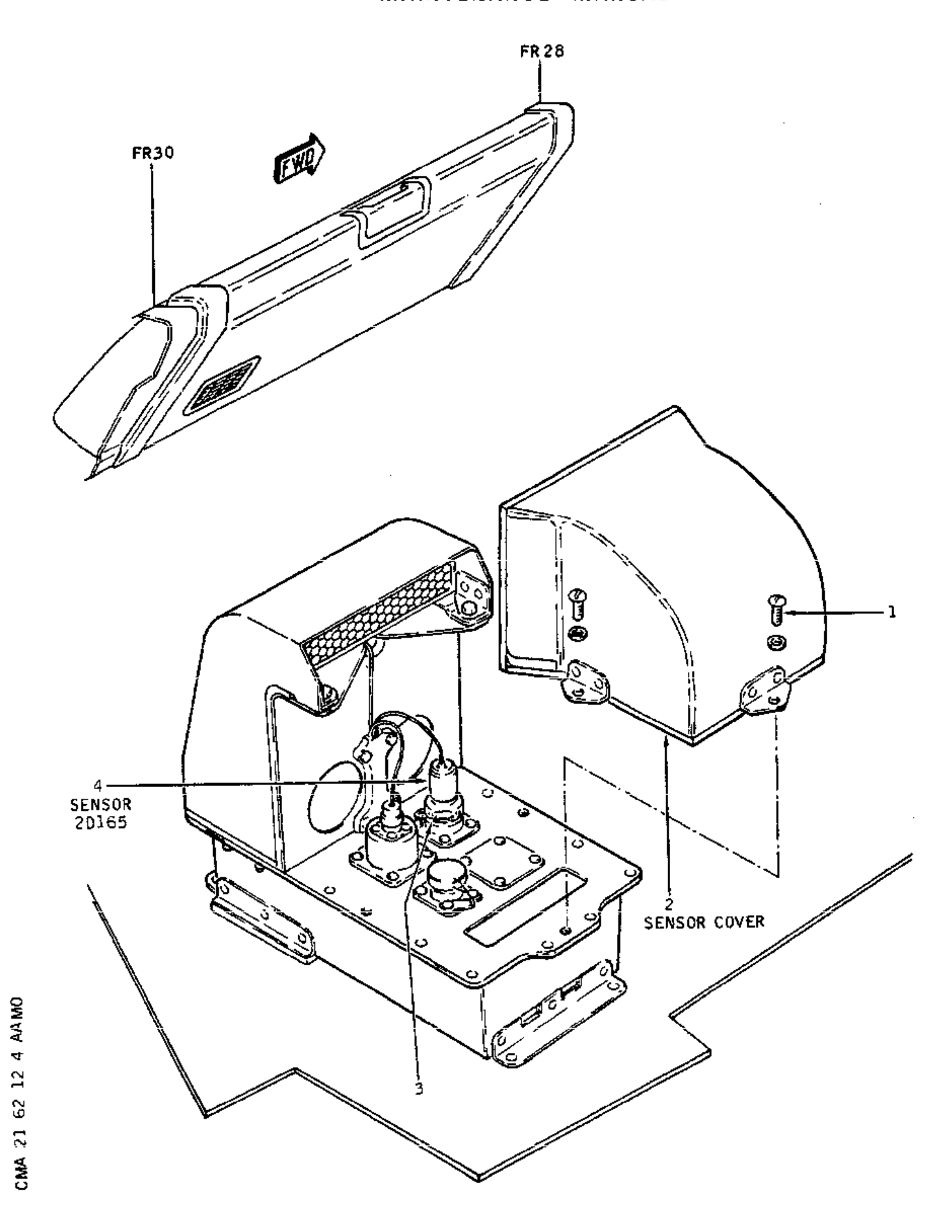
(1) Cut ambient temperature sensor lockwire (3).

(2) Disconnect temperature sensor electrical connector.

(3) Unscrew temperature sensor, remove seal.

D. Preparation of Replacement Component

(1) Make certain that electrical connector is in good condition (on aircraft wiring side and on temperature sensor side).



Ambient Temperature Sensor
Figure 401

(2) Check that temperature sensor is free from dents or traces of corrosion.

E. Install

(1) Install a seal and offer up temperature sensor in its location.

(2) Tighten and wirelock temperature sensor.

(3) Connect electrical connector.

F. Test

(1) Remove safety clip and tag and reset the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FWD CABIN TEMP IND	5-213	2D 161	D 8

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(3) Place thermometer in sampling duct fan airflow and note the temperature.

(4) On panel 2-214, make certain that temperature indicated by FWD CABIN temperature indicator corresponds to the temperature indicated by thermometer (± 3°C).

G. Close-Up

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(2) Install sensor cover (2). Tighten the 3 screws (1).

(3) Make certain that hatrack is clean and clear of tools and miscellaneous items of equipment.

(4) Close hatrack.

SAMPLING DUCT FAN - REMOVAL/INSTALLATION

1. General

Sampling duct fan H1029 is located in hatrack forward of frame 30.

2. Sampling Duct Fan

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clip	-

B. Prepare

(1) Trip, safety and tag the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP 2 SAMPLING DUCT FAN	4-213	H1005	D12

C. Remove (Ref. Fig. 401)

(1) Open hatrack.

(2) Remove screws (1) and furnishing panel (2).

(3) Remove screws (4) and sensor protective cover (5).

(4) Remove screws (10) and sampling duct fan protective cover (9).

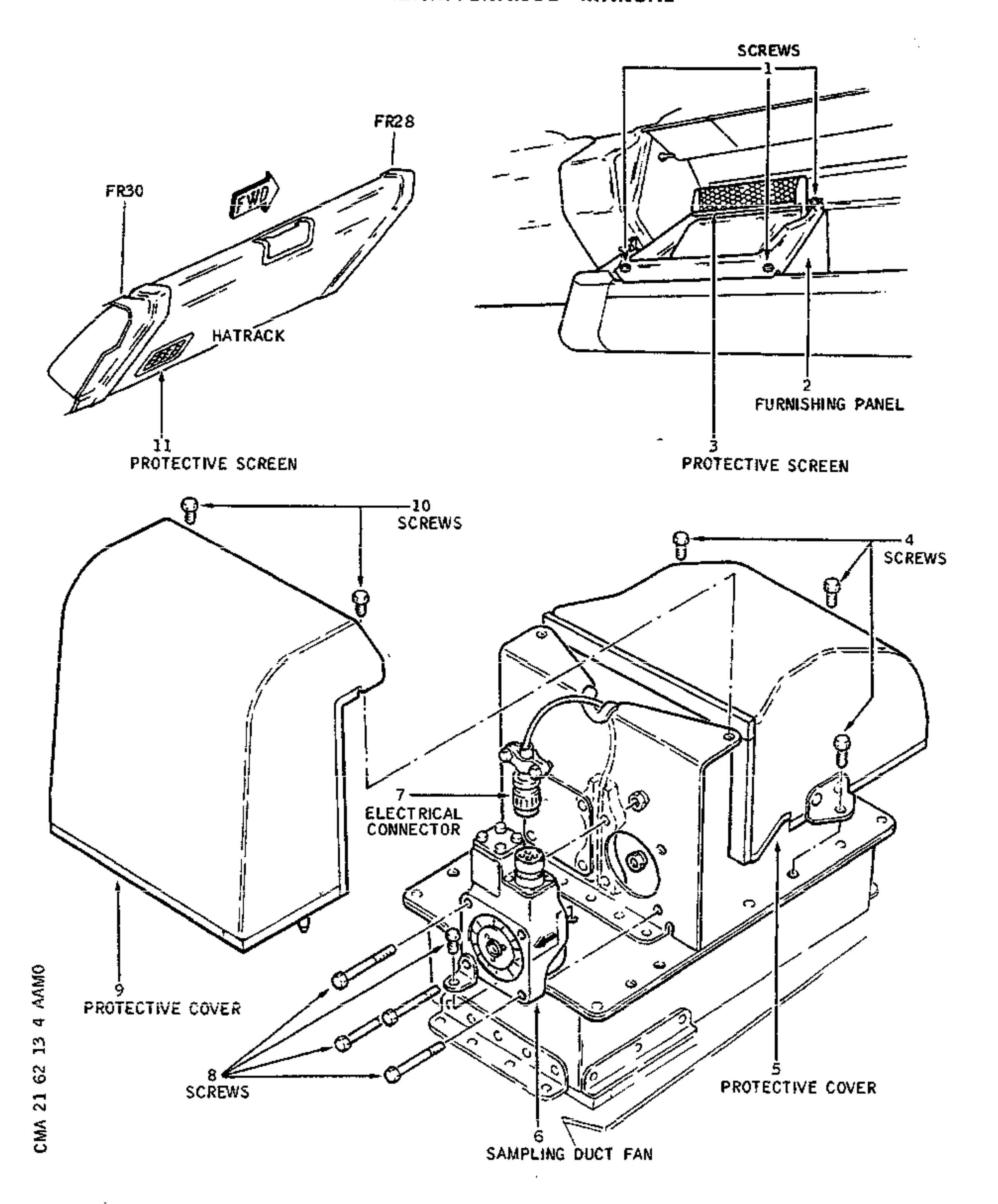
R (5) Remove sampling duct fan electrical connector (7).

R (6) Remove screws (8) and sampling duct fan (6). Retain nuts and washers located on fairlead side.

D. Install

R (1) Install sampling duct fan (6). Attach with screws (8) (nuts and washers on fairlead side).

NOTE: Install fan with arrow in direction of required airflow.



R Sampling Duct Fan
Figure 401

R (2) Connect electrical connector (7).

(3) Install fan protective cover (9). Attach with screws (10).

(4) Install sensor protective cover (5). Attach with screws (4).

(5) Install furnishing panel (2) and attach with screws (1).

(6) Close hatrack.

E. Test

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(2) Remove safety clip and tag and reset the circuit breaker tripped in para. 2. B. (1).

(3) Check that air is drawn in hatrack through protective
R screen (11) and blown towards protective screen (3) inside hatrack.

F. Close-Up

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

AMBIENT TEMPERATURE INDICATOR - REMOVAL/INSTALLATION

1. General

The forward cabin ambient temperature indicator 2D163 is located on Flight Engineer panel 2-214.

2. Flight Compartment Ambient Temperature Indicator 2D163

A. Equipment and Materials

DESCRIPTION	PART NO.
Not Applicable	

B. Prepare

WARNING : AS A SAFETY MEASURE AND IN ORDER TO TAKE ALL NECESSARY PRECAUTIONS AGAINST INADVERTENT OPERATIONS, DISPLAY A WARNING NOTICE ON THE ELECTRICAL GROUND CONNECTOR PROHIBITING ENERGIZATION OF THE AIRCRAFT ELECTRICAL NETWORK.

(1) On EMERG GEN Flight Engineer panel 6-214, make certain that BATT A and BATT B switches are in OFF position.

WARNING : AS A SAFETY MEASURE AND IN ORDER TO TAKE ALL NECESSARY PRECAUTIONS AGAINST INADVERTENT OPERATIONS, DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF BATT A AND BATT B SWITCHES.

(2) At Flight Engineer's station, open panel 2-214 (12 1/4 turn fasteners).

C. Remove

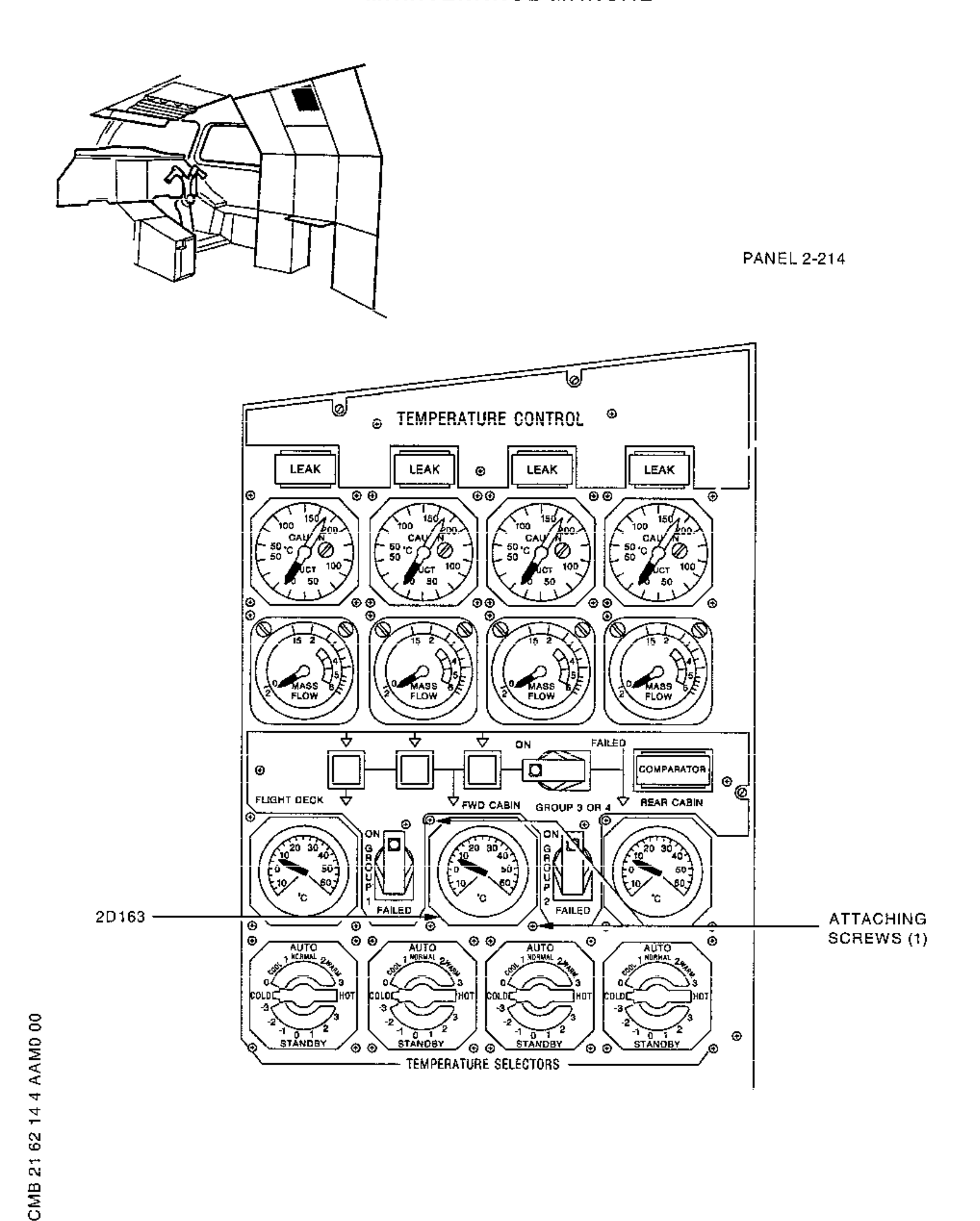
(1) At Flight Engineer station on TEMPERATURE CONTROL panel, disconnect connector (2D163A) from temperature indicator.

(2) Hold indicator with one hand and unscrew both attaching screws (1) (located on front face of panel).

(3) Remove the indicator.

D. Preparation of Replacement Component

(1) Make certain that the indicator shows no dents or



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Location of Ambient Temperature Indicator (2D163)
Figure 401

scratched paint.

(2) Remove protective cap from electrical connector ; make certain that pins are neither distorted nor damaged.

E. Install

(1) Install indicator on panel (on front face) screw both attaching screws.

(2) Connect electrical connector (2D163A) to ambient temperature indicator 2D163.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(3) Close Flight Engineer panel 2-214 (12 screws, 1/4 turn).

B F. Test

B Check for correct operation by comparison with indicators
B of other groups.

G. Close-Up

(1) Remove warning notices from :

(a) Ground connector.

(b) EMER GEN panel.

1. Functional Test of Ambient Temperature Indicator

A. General

The purpose of the test is to check that FWD CABIN ambient temperature indicator operates conectly

B. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Decade Resistance Box	
Circuit Breaker Safety Clips	
1 Test Electrical Connector	

C. Prepare (Ref. Fig. 501)

(1) Trip, safety and tag the following circuit breaker

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FWD CABIN TEMP IND	5-213	2D 161	D 8

(2) Gain access to ambient temperature sensor (Ref. 21-62-12, Page 401, R/I)

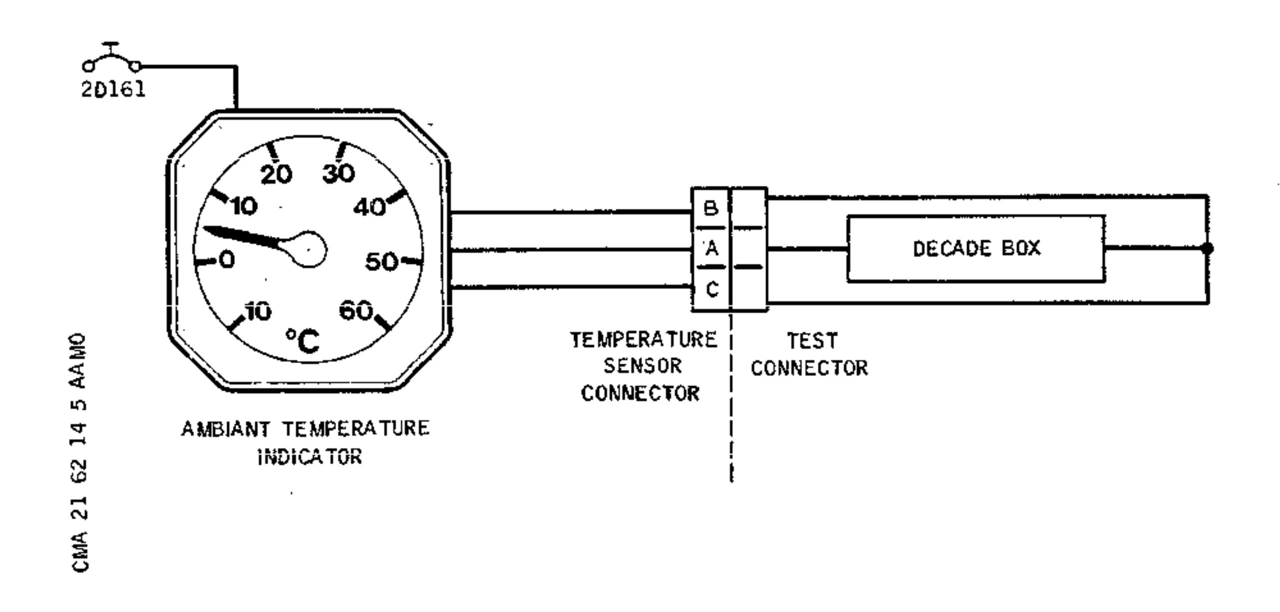
(3) Disconnect electrical connector from ambient temperature sensor (2D165)

(4) Connect decade box to aircraft wining according to the figure

(5) Select a value of 124,85 ohms on decade resistance box

(6) Set FWD CABIN TEMP IND circuit breaker

(7) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, S)



Ambient Temperature Indicator Test
Figure 501

D. Test

(1) On decade box select resistance values according to table below and check that FWD CABIN ambient temperature indicator indicates the corresponding value.

Temperature °C	-10	0	10	20	30	40	50	60
Decade box Resistance	124.85	130	135.13	140.25	145.35	150.44	155.51	160.56

NOTE : Tolerance on FWD CABIN temperature indicator is :

± 1.5°C in + 10°C to 30°C range
± 3°C out of this range

(2) Increase resistance value on resistance box until ambient temperature indicator pointer reaches maximum

stop.
Disconnect electrical wire between A terminal of test connector and decade box. Indicator pointer must remain on maximun stop.

(3) Trip the following circuit breaker

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FWD CABIN TEMP IND	5-213	2D 161	D 8

(4) Temperature indicator pointer must position below the first graduation

E. Close Up

(1) Disconnect test connector from ambient temperature sensor. Remove decade box

(2) Reconnect ambient temperature sensor 2D165 electrical connector

(3) Install cover and close hatrack (Ref. 21-62-12, Page 401, D/O)

(4) Reset FWD CABIN TEMP IND circuit breaker

(5) De-energize the aircraft electrical network and disconnect electrical ground power unit.

DUAL AIR CONDITIONING TEMPERATURE INDICATOR
REMOVAL/INSTALLATION

1. General

The dual air conditioning temperature indicator (2D164) is located on Flight Engineer panel 2-214.

2. Dual Air Conditioning Temperature Indicator 2D164

A. Equipment and Materials

DESCRIPTION	PART NO.

Not Applicable

B. Prepare

WARNING : AS A SAFETY MEASURE AND IN ORDER TO TAKE ALL NECESSARY PRECAUTIONS AGAINST INADVERTENT OPERATIONS, DISPLAY A WARNING NOTICE ON THE ELECTRICAL GROUND CONNECTOR PROHIBITING ENERGIZATION OF THE AIRCRAFT ELECTRICAL NETWORK.

(1) On EMERG GEN Flight Engineer panel 6-214, make certain that BATT A and BATT B switches are in OFF position.

WARNING : AS A SAFETY MEASURE AND IN ORDER TO TAKE ALL NECESSARY PRECAUTIONS AGAINST INADVERTENT OPERATIONS, DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF BATT A AND BATT B SWITCHES.

(2) Open Flight Engineer panel 2-214 (12 1/4 turn fasteners).

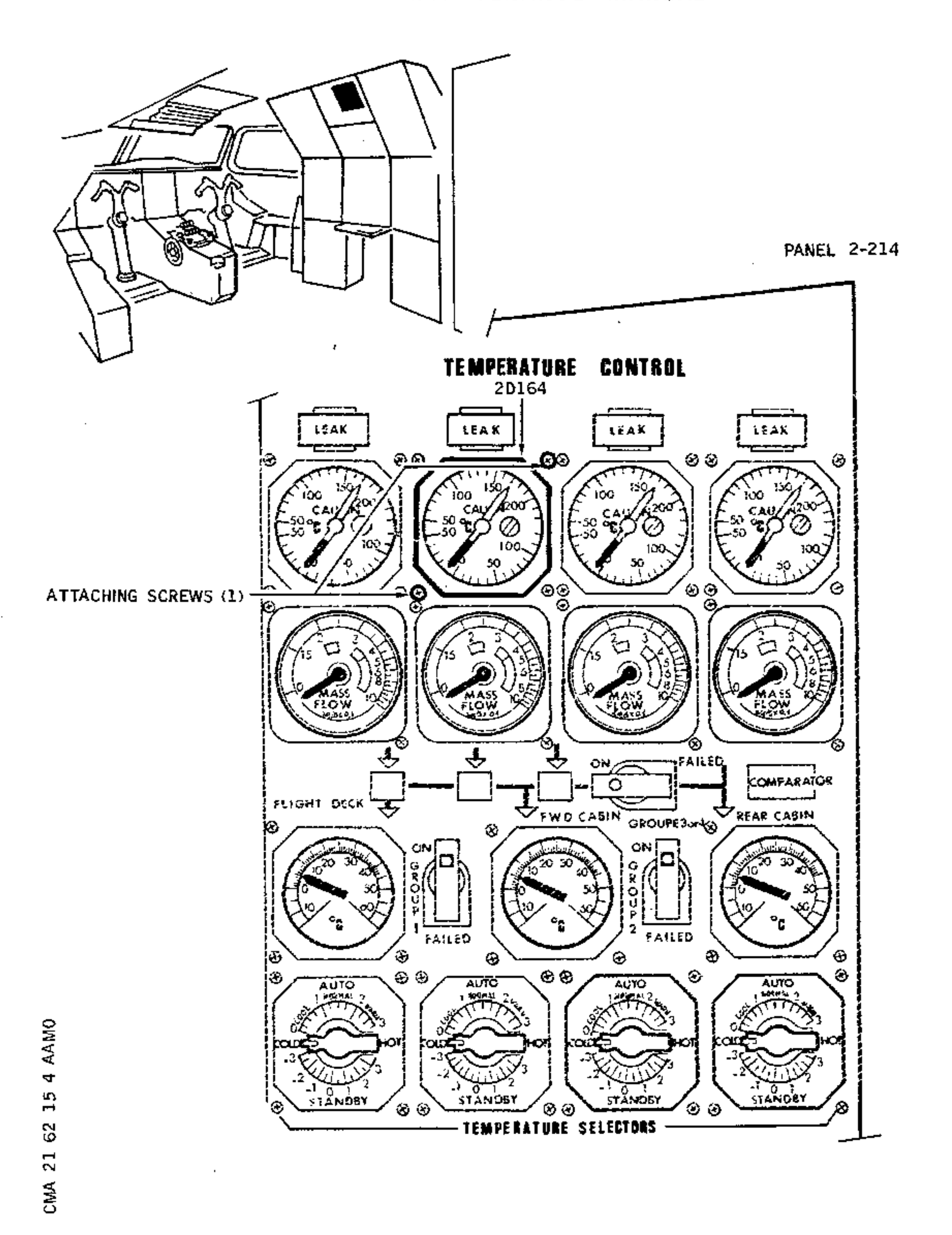
C. Remove

(1) On TEMPERATURE CONTROL panel 2-214, disconnect electrical connector 2D164A from indicator.

(2) Hold indicator with one hand ; unscrew both attaching nuts (1) (located on front face of panel).

(3) Remove indicator.

D. Preparation of Replacement Component



Location of Dual Air Conditioning Temperature
Indicator 2D164
Figure 401

(1) Make certain that indicator shows no dents or scratched paint.

(2) Remove blanking cap from electrical connector and make certain that pins are neither distorted nor damaged.

E. Install

(1) Install indicator on panel (on front face) screw both attaching screws.

(2) Connect electrical connector (2D164A) to indicator (2D164).

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND :ISCELLANEOUS ITEMS OF EQUIPMENT.

(3) Close panel 2-214 (12 1/4 turn fasteners).

B F. Test

B Check for correct operation by comparison with indicators
B of other groups.

G. Close-Up

(1) Remove warning notices :

(a) From ground connector.

(b) From EMERG GEN panel.

Printed in England

DUAL AIR CONDITIONING TEMPERATURE INDICATOR - ADJUSTMENT/TEST

1. General

The dual air conditioning temperature indicator 2D164 test procedure is dealt with in the following topic :
21-61-16, A/T.

TEMPERATURE CONTROL VALVE POSITION INDICATOR - REMOVAL/INSTALLATION

1. General

The removal/installation of group 2 indicator (H 1016) is dealt with in topic 21-61-17.

TEMPERATURE CONTROLLER - REMOVAL/INSTALLATION

1. General

The removal/installation of the temperature controller is dealt with in 21-61-21.

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TEMPERATURE SELECTOR - REMOVAL/INSTALLATION

1. General

Temperature selector H1020 is located on flight Engineer TEMPERATURE CONTROL panel 2-214.

2. Temperature Selector H1020

A. Equipment and Materials

DESCRIPTION	PART NO.
Not Applicable	

B. Prepare

WARNING : AS A SAFETY MEASURE AND IN ORDER TO TAKE ALL NECESSARY PRECAUTIONS AGAINST INADVERTENT OPERATIONS, DISPLAY A WARNING NOTICE ON THE ELECTRICAL GROUND CONNECTOR PROHIBITING ENERGIZATION OF THE AIRCRAFT ELECTRICAL NETWORK.

(1) On EMERG GEN Flight Engineer panel 6-214, make certain that BATT A and BATT B switches are in OFF position.

WARNING : AS A SAFETY MEASURED AND IN ORDER TO TAKE ALL NECESSARY PRECAUTIONS AGAINST INADVERTENT OPERATIONS, DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF BATT A AND BATT B SWITCHES.

(2) At Flight Engineer station, open TEMPERATURE CONTROL panel 2-214 (12 1/4 turn fasteners).

C. Remove

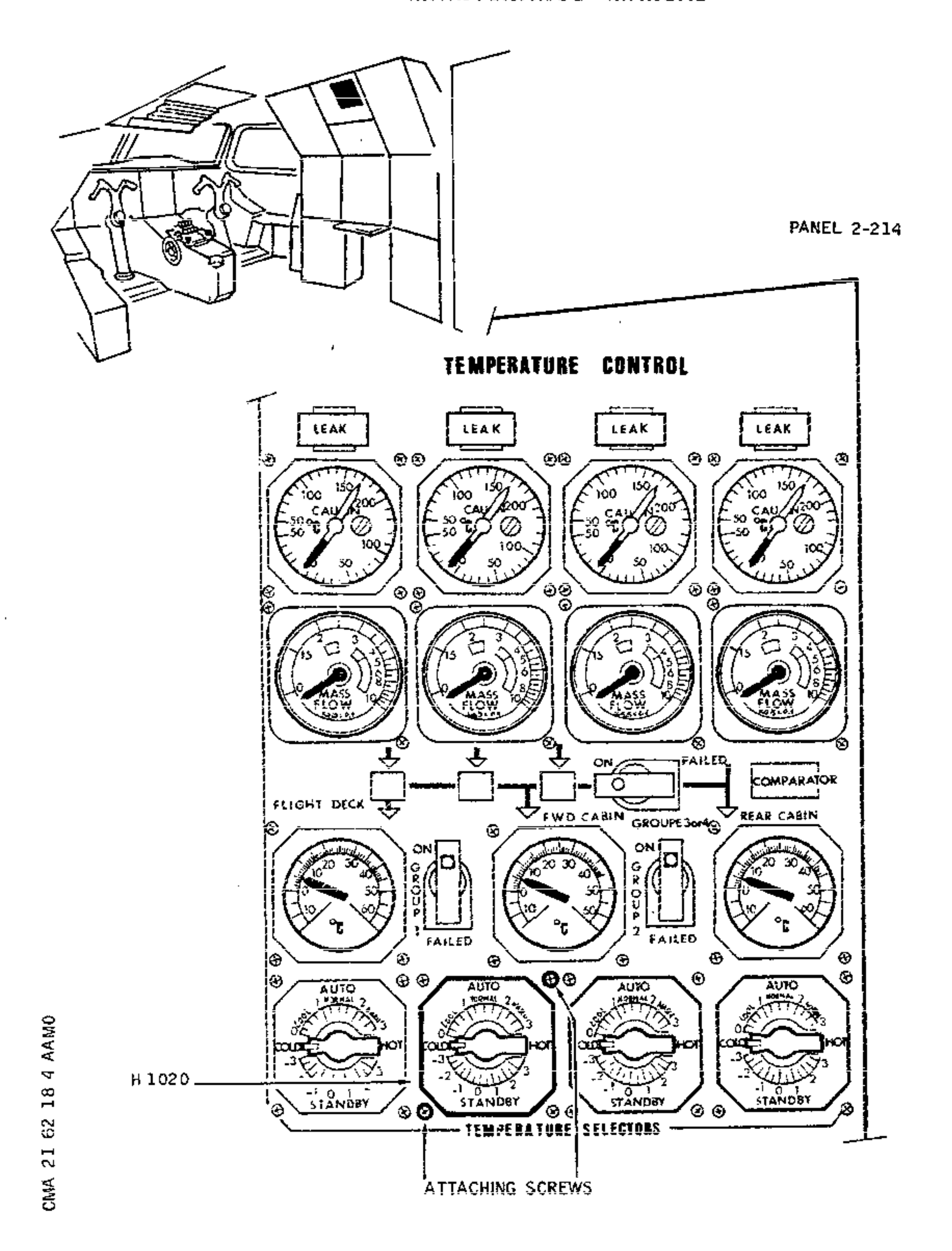
(1) On Flight Engineer TEMPERATURE CONTROL panel, unscrew connector H1020A from temperature selector.

(2) Unscrew attaching screws (access through forward face of panel) while holding selector with one hand.

(3) Remove temperature selector

D. Preparation of Replacement Component

(1) Make certain that selector shows no dents or scratched paint.



Location of Temperature Selector H1020
Figure 401

(2) Remove protective cap from electrical connector ; make certain that pin are neither distorted nor damaged.

E. Install

(1) Install selector on panel, screw attaching screws (located on front face of panel).

(2) Connect electrical connector (H1020A) to temperature selector.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(3) Close TEMPERATURE CONTROL panel 2-214 (12 1/4 turn, fateners).

B F. Deleted

G. Close-Up

(1) Remove warning notices from :

(a) Ground electrical connector

(b) EMERG GEN panel.

FUSELAGE MINI-MAXI TEMPERATURE SENSOR - REMOVAL/INSTALLATION

1. General

   The fuselage mini-maxi temperature sensor H1041 is located in zone 233 between frames 60 and 61.

2. Fuselage Mini-Maxi Temperature Sensor

   A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clip	
Corrosion Resistant Steel Lockwire Dia. 0.032 in. (0.8 mm)	

   B. Prepare

   (1) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP2 TEMP SELECTOR AUTO SUP & CONT	4-213	H1001	E11

   (2) In passenger compartment, open floor panel 233GF.

   C. Remove (Ref. Fig. 401)

   (1) Disconnect electrical connector (1).

   (2) Remove lockwire and screws (2).

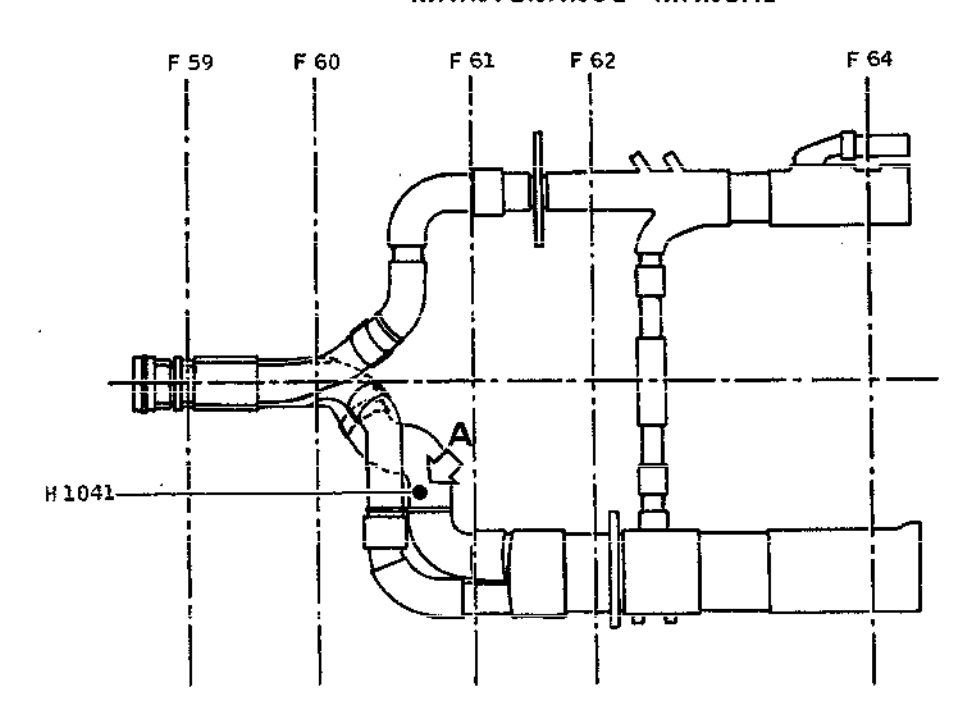
   (3) Remove sensor (3) and discard seal (4).

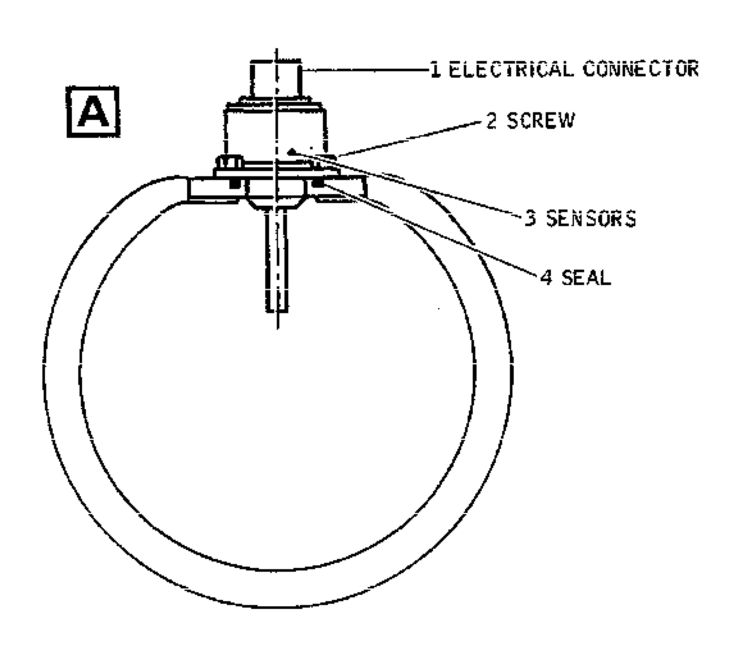
   D. Install

   (1) Install sensor (3), equipped with a new seal (4).

   (2) Install screws (2) and wirelock.

   (3) Connect electrical connector (1).





CMA 21 62 31 4 AAM0

Fuselage Mini-Maxi Temperature Sensor
Figure 401

E. Close-Up

(1) Close floor panel.

(2) Remove safety clip and tag and reset the circuit breaker tripped in paragraph 2.B (1).

AMBIENT TEMPERATURE SENSOR - REMOVAL/INSTALLATION

1. General

R Ambient temperature sensor H1045 is located in LH hatrack
R forward of frame 30.

2. Ambient Temperature Sensor

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clip	

B. Prepare

(1) Trip, safety and tag the following circuit breaker :

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R	Group 2 Sensor - H1046 GRP 2 TEMP SELECTOR AUTO SUP & CONT	4-213	H1001	E11

C. Remove (Ref. Fig. 401)

R (1) Open hatrack.

(2) Remove screws (1) and furnishing panel (2).

(3) Remove screws (3) and sensor protective cover (4).

(4) Disconnect sensor electrical connector (5).

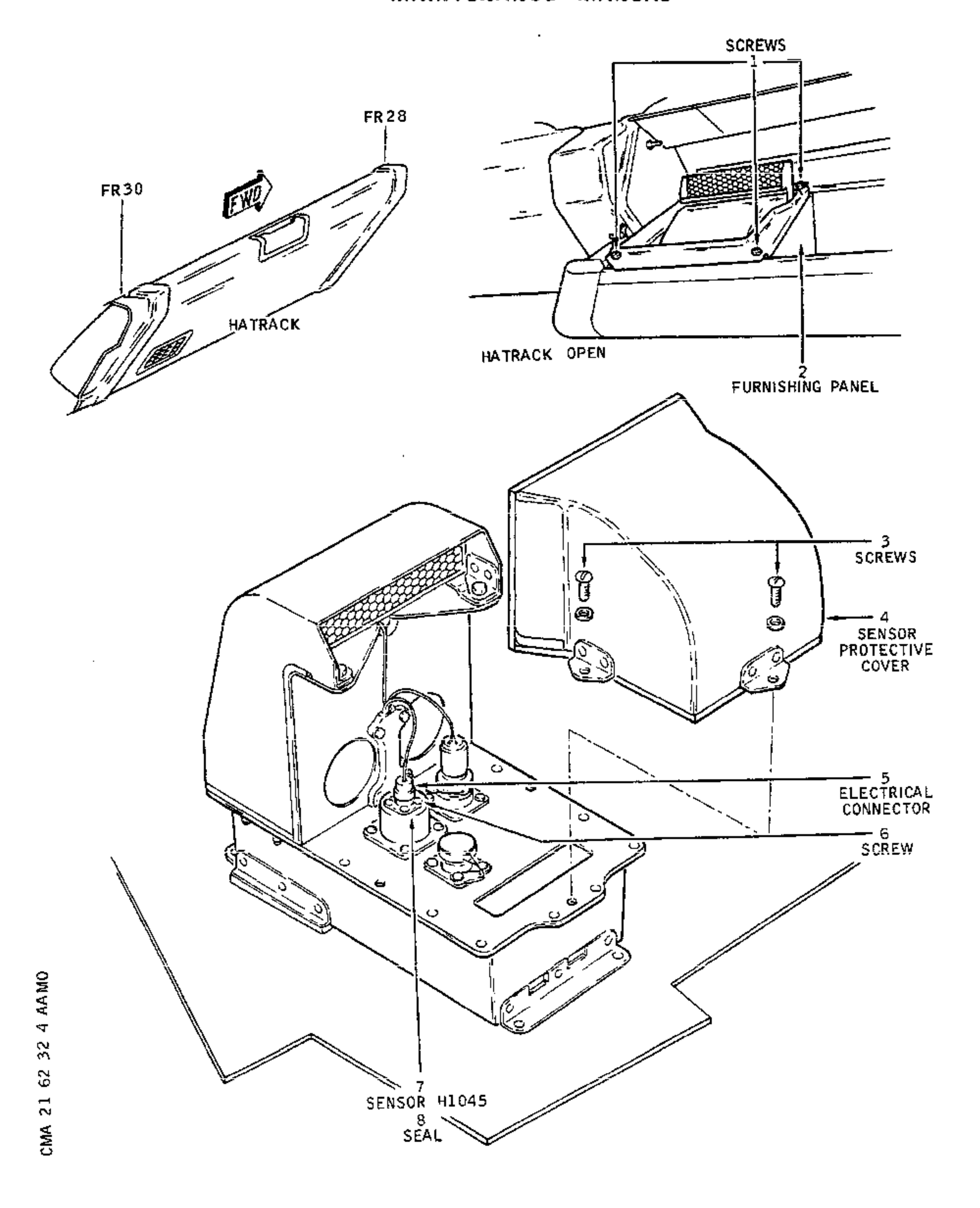
(5) Remove screws (6) and sensor (7), discard seal (8).

D. Install

(1) Install sensor (7) fitted with a new seal (8) ; attach with screws (6).

(2) Connect electrical connector (5).

(3) Install sensor protective cover (4), attach with screws



Ambient Temperature Sensor
Figure 401

R

(3).

(4) Install furnishing panel (2) ; attach with screws (1).

(5) Close hatrack.

E. Close-Up

(1) Remove safety clip and tag and reset the circuit breaker tripped in paragraph 2.B.(1).

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TEMPERATURE CONTROL VALVE - REMOVAL/INSTALLATION

R 1. General

R The removal/installation of the temperature control valve is
R dealt with in 21-61-31, Removal/Installation.

TEMPERATURE CONTROL VALVE - ADJUSTMENT/TEST

1. General

The test of the temperature control valve is dealt with in :

21-61-31 (A/T)

Printed in England

COLD AIR UNIT OUTLET ICE SENSOR TRANSDUCER REMOVAL/INSTALLATION

1. General

The removal/installation of the cold air unit outlet ice sensor transducer is dealt with in :

21-61-32 (R/I)

COLD AIR UNIT OUTLET ICE SENSOR//TRANSDUCER ADJUSTMENT/TEST

1. General

The adjustment/test of the cold air unit outlet ice sensor transducer of air condition group 2 is dealt with in 21-61-32, Adjustment/Test.

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COLD AIR UNIT OUTLET TEMPERATURE SENSOR
REMOVAL/INSTALLATION

1. General

The removal/installation of cold air unit outlet temperature sensor 2D166 of air conditioning group 2 is dealt with in 21-61-34, Removal/Installation.

WING MINI-MAXI TEMPERATURE SENSOR REMOVAL/INSTALLATION

1. General

The removal/installation of the wing mini-maxi temperature sensor of air conditioning group 2 is dealt with in 21-61-35, Removal/Installation.

SEMI-AUTOMATIC TEMPERATURE SENSOR - REMOVAL/INSTALLATION

1. General

The Removal/Installation of semi-automatic temperature sensor H1065 is dealt with in :
    21-61-36, Removal/Installation

COLD AIR UNIT OUTLET ICE SENSOR GRILLE - REMOVAL/INSTALLATION

1. General

The removal/installation of the cold air unit outlet ice sensor grille is dealt with in :

21-61-33 (R/I)

COLD AIR UNIT INLET TEMPERATURE SENSOR REMOVAL/INSTALLATION

1. General

The removal/installation of the cold air unit inlet temperature sensor of air conditioning group 2 is dealt with in 21-61-37, Removal/Installation.

AFT CABIN TEMPERATURE CONTROL - DESCRIPTION AND OPERATION

1. General

Under normal conditions the aft cabin air conditioning is achieved by groups 3 and 4.
The temperature control system maintains temperature in aft cabin between 15°C and 30°C.
Groups 3 and 4 include their own temperature control system which :

- limits air temperature in the duct downstream of the cold air unit turbine
- limits air temperature in the distribution duct supplying the aft cabin
- enables de-icing of the duct, if necessary, downstream of the cold air unit turbine for an altitude above 30,000 feet only.
- allows manual adjustment of air temperature downstream of the cold air unit turbine in case of failure in the automatic control of the group.

The temperature control systems for groups 3 and 4 are normally connected in order to obtain in both groups the same mixing temperature in automatic mode. They can also operate independently.

2. Description (Ref. Fig. 001)

A. Each temperature control system mainly consists of the following items :

(1) Temperature control valve H1038 for Group 3 and H1039 for group 4.

(2) Valve position indicator H1017 for group 3 and H1018 for group 4.

(3) Temperature controller H1025 for group 3 and H1026 for group 4.

(4) Temperature selector H1021 for group 3 and H1022 for group 4.

(5) Ice sensor transducer H1054 for group 3 and H1055 for group 4.

(6) Ambient pressure switch H1034 for group 3 and H1035 for group 4.

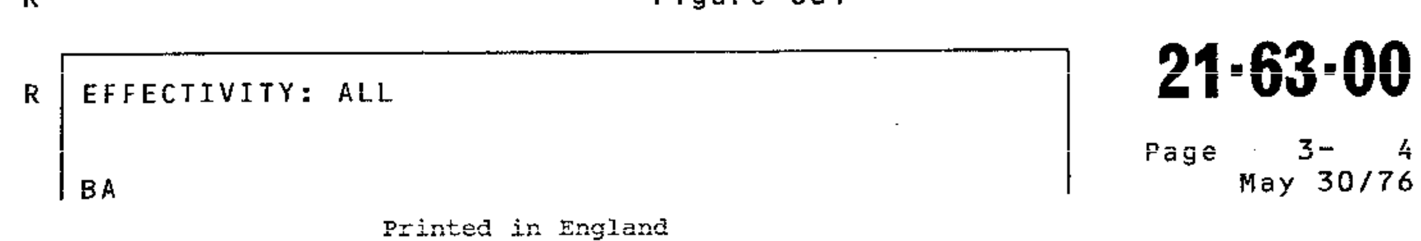
(7) Four ambient temperature sensors H1042, H1046, H1050,

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FUEL EXCH
DUCT
POSITION INDICATOR TCV
FUEL EXCH
DUCT
POSITION INDICATOR TCV
COMPARATOR
TEMPERATURE CONTROLLER H1025
TEMPERATURE CONTROLLER H1026
TEMP CONT VALVE
30000ft
30 000ft
TEMP CONT VALVE
FUSELAGE MINI-MAXI TEMPERATURE SENSOR
1H1042
FUSELAGE MINI-MAXI TEMPERATURE SENSOR
1H1043
SAMPLING DUCT FAN H1031
SAMPLING DUCT FAN H1030
AMBIENT TEMPERATURE SENSOR
3D165
AMBIENT TEMPERATURE SENSOR
H1046
H1047 AMBIENT TEMPERATURE SENSOR
DISTRIBUTION CHAMBER
CAU INLET TEMPERATURE SENSOR 3D167
CAU OUTLET ICE SENSOR TRANSDUCER H1054
AMBIENT PRESSURE SWITCH H1034
CAU OUTLET TEMPERATURE SENSOR 3D166
SEMI AUTO TEMPERATURE SENSOR H1066
WING MINI-MAXI TEMP SENSOR H1050
WING MINI-MAXI TEMP SENSOR H1051
AMBIENT PRESSURE SWITCH H1035
CAU OUTLET ICE SENSOR TRANSDUCER H1055
CAU INLET TEMPERATURE SENSOR 4D167
4D166 CAU OUTLET TEMPERATURE SENSOR
H1067 SEMI AUTO TEMPERATURE SENSOR
COMPARISON UNIT H1027
CMA 21 63 00 0 AAM0

Aft Cabin Temperature Control - GR3 - Schematic
Figure 001

R



H1066 for group 3 and H1043, H1047, H1051, H1067 for group 4.

(8) Dual air conditioning temperature indicator 3D164 for group 3 and 4D164 for group 4.

(9) Two temperature sensors 3D166, 3D167 for group 3 associated with indicator 3D164 and sensors 4D166, 4D167 for group 4 associated with indicator 4D164.

(10) Two sample duct fans H1030 and H1031.

B. Components common to both temperature control systems :

(1) Comparison unit H1027

(2) Ambient temperature indicator 3D163.

(3) An ambient temperature sensor 3D165 associated with indicator 3D162. This sensor is identical with sensors 3/4D166 and 3/4D167.

3. <u>Valve - Temperature Control</u>

A. The temperature control valves (T.C.V) of groups 3 and 4 are identical. They operate in the same way as the temperature control valve for flight compartment (Ref. 21-61-00, Description and Operation).
These valves placed on a line by-passing the cold air units are accessible through door 633DT for group 3 and door 634CT for group 4.

4. <u>Indicator - Temperature Control Valve Position</u>

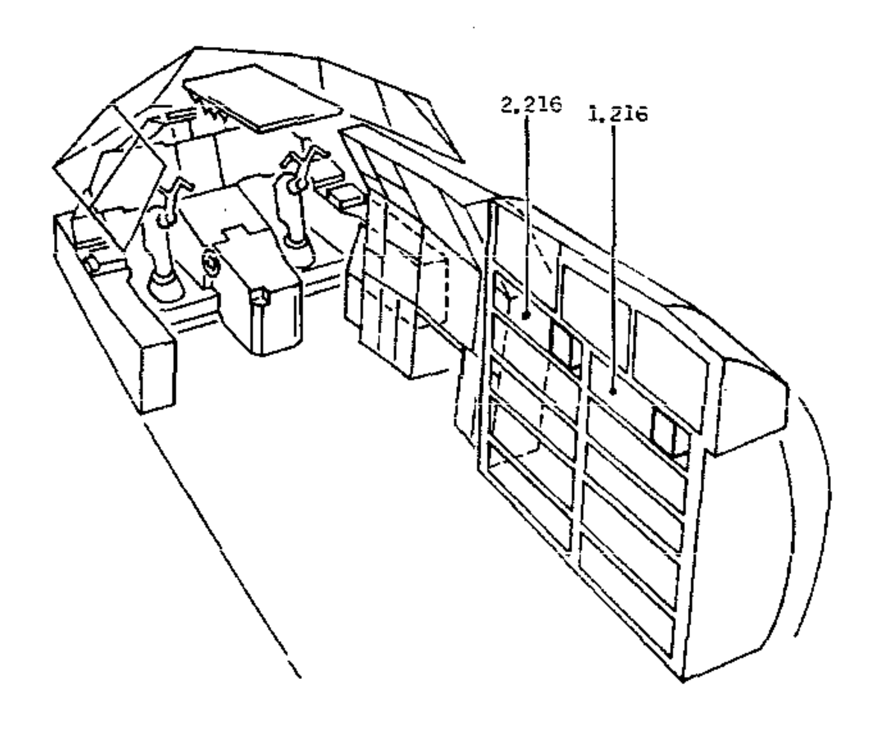
A. The indicators are installed on Flight Engineer's panel 2-214 and are associated with the temperature control valves of groups 3 and 4. They are identical with that of flight compartment temperature control system (Ref. 21-61-00, Description and Operation).

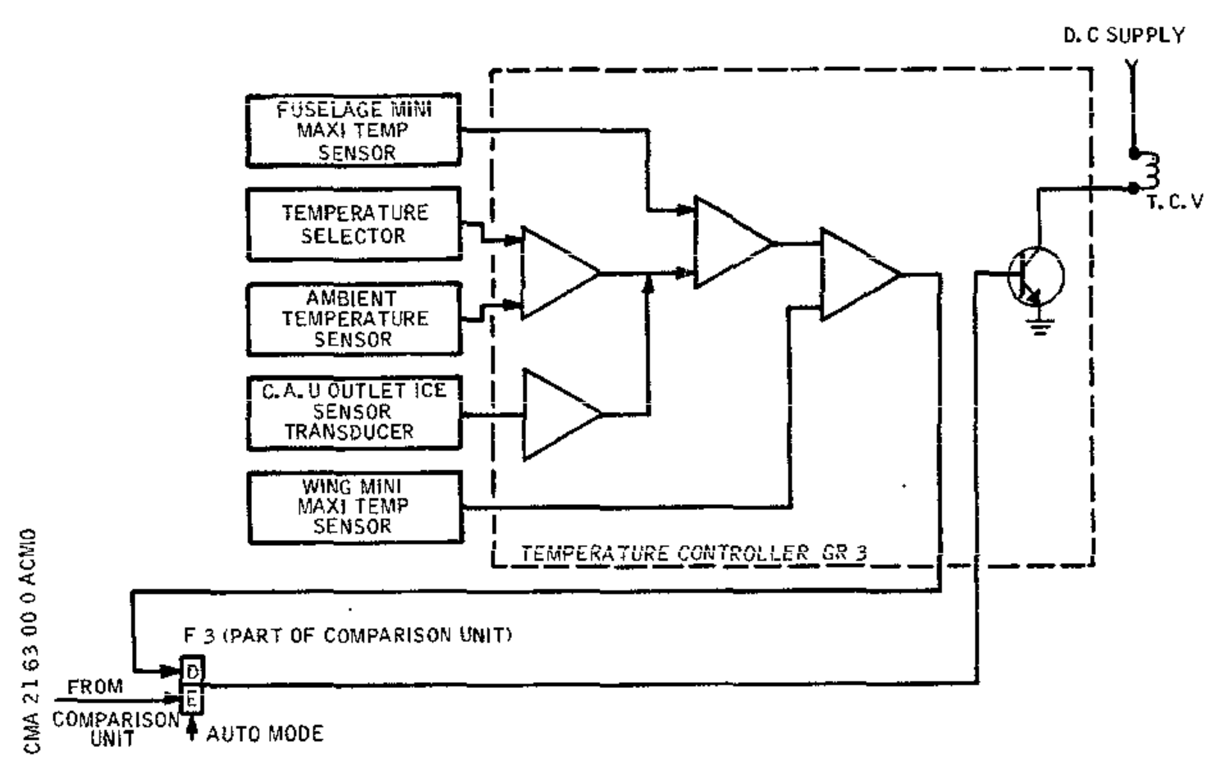
5. <u>Controller - Temperature</u> (Ref. Fig. 002)

A. Description

The two temperature controllers are electronic units located in electronics rack 1-216 for group 3 and in rack 2-216 for group 4. They are identical with flight compartment temperature controller (Ref. 21-61-00, Description and Operation).

B. Operation





Temperature Controller - Schematic
Figure 002

(1) General

Operation of group 3 temperature controller is pratically identical to that of group 4.
Any variation in aft cabin required temperature (set at the temperature selector) and the actual temperature displayed by the ambient temperature sensor generates an error signal.
This error signal is modified inside the temperature controller according to the air temperature in the mixing duct and fan duct.
Additionaly in case of mixing duct icing, the signal level is raised until icing phenomenum has disappeared (efficient above 30,000 feet).
The resulting signal is then applied to the temperature control valve motor (automatic operation). The valve opens or closes depending on the temperature desired.

(2) Normal operation (AUTO mode selected with comparison function).

The temperature controller of group 4 transmits signals to the temperature control valves of groups 3 and 4. The temperature selector of group 4 then controls aft cabin temperature control system.

(3) Independent operation (Group 3 or 4 switch in FAILED position after failure of the comparison function).
In this case, each temperature controller is then independent and the temperature controller of group 3 transmits signals to temperature control valve of group 3, and temperature controller of group 4 towards temperature control valve of group 4.

NOTE : The temperature controllers only operate in automatic mode (temperature selectors GR3 and 4 placed in AUTO position). In the event of a failure of either one of aft cabin groups, the air conditioning is ensured by the group remaining operational.

6. Selectors - Temperature

The temperature selectors of groups 3 and 4 are installed on panel 2-214. Description and operation of these selectors are identical to those of group 1 selector (Ref. 21-61-00, Description and Operation).
In STANDBY mode, the temperature selector of group 3 operates in conjunction with semi-automatic temperature sensor H1066 and the temperature selector of group 4 operates in conjunction with

semi automatic temperature sensor H1067.

7. Transducers - Ice Sensor

The ice sensor transducers located in the wing are identical to those of group 1 (Ref. 21-61-00, Description and Operation). The transducer of group 3 is accessible through door 633FT, that of group 4 through door 634ET.

8. Switches - Ambient Pressure

They are identical to those of group 1 (Ref. 21-61-00, Description and Operation).
The ambient temperature switch of group 3 (H1034) is located in baggage compartment between Frames 10 and 11 is accessible through door 123AB.
The ambient temperature switch of group 4 (H1035) is located in baggage compartment between Frames 15 and 16 is accessible through door 123BB.

9. Sensors - Ambient Temperature

Groups 3 and 4 each include four sensors of the same type :

- the semi automatic temperature sensors H1066 for group 3 and H1067 for group 4 which control temperature in manual mode (temperature selector in STANDBY position) and which are located in a wing duct of their respective group.

- the wing mini-maxi temperature sensors H1050 for group 3 and H1051 for group 4 located in a wing duct of their respective group.

- the fuselage mini-maxi temperature sensors H1042 for group 3 and H1043 for group 4 located downstream of the distribution chamber

- the ambient temperature sensors H1046 for group 3 and H1047 for group 4 located in a duct between Frames 66 and 68. This duct is accessible through LH hat-rack.
  These last six sensors are used to control temperature in automatic mode.
  Description and operation of these sensors is dealt with in 21-61-00, Description and Operation.

10. Indicators - Dual Air Conditioning Temperature

The temperature indicators 3D164 for group 3 and 4D164 for group 4 located on Flight Engineer's panel 2-214 display air temperature at the inlet and outlet of the associated cold air unit.

Description and operation of these indicators are identical to those of group 1 indicator (Ref. 21-61-00, Description and Operation).
The lower graduations correspond to air temperature at cold air unit outlet (sensor 3D165 for group 3 and sensor 4D165 for group 4).
The upper graduations correspond to air temperature at cold air unit inlet (sensor 3D167 for group 3 and sensor 4D167 for group 4).

11. Sensors - Ambient Temperature

The aft cabin temperature control system includes four identical temperature sensors : 2 for group 3 (3D166 and 3D167) and 2 for group 4 (4D166 and 4D167).
The sensors 3D166 (group 3) and 4D166 (group 4) located in duct at bootstrap outlet and sensors 3D167 (group 3) and 4D167 (group 4) located in duct at bootstrap inlet transmit temperature information to indicators 3D164 and 4D164.
These ambient temperature sensors are identical with those in flight compartment temperature control system (Ref. 21-61-00, Description and Operation).

12. Fans - Sampling Duct

Sampling duct fans H1030 and 1031 in aft cabin cool the duct in which are attached ambient temperature sensors H1046 (group 3), H1047 (group 4) and aft cabin temperature sensor 3D165.
The microfans installed in the same duct between Frames 6 and 68 are accessible through LH hat rack.
They are identical to those in flight compartment system (Ref. 21-61-00, Description and Operation).

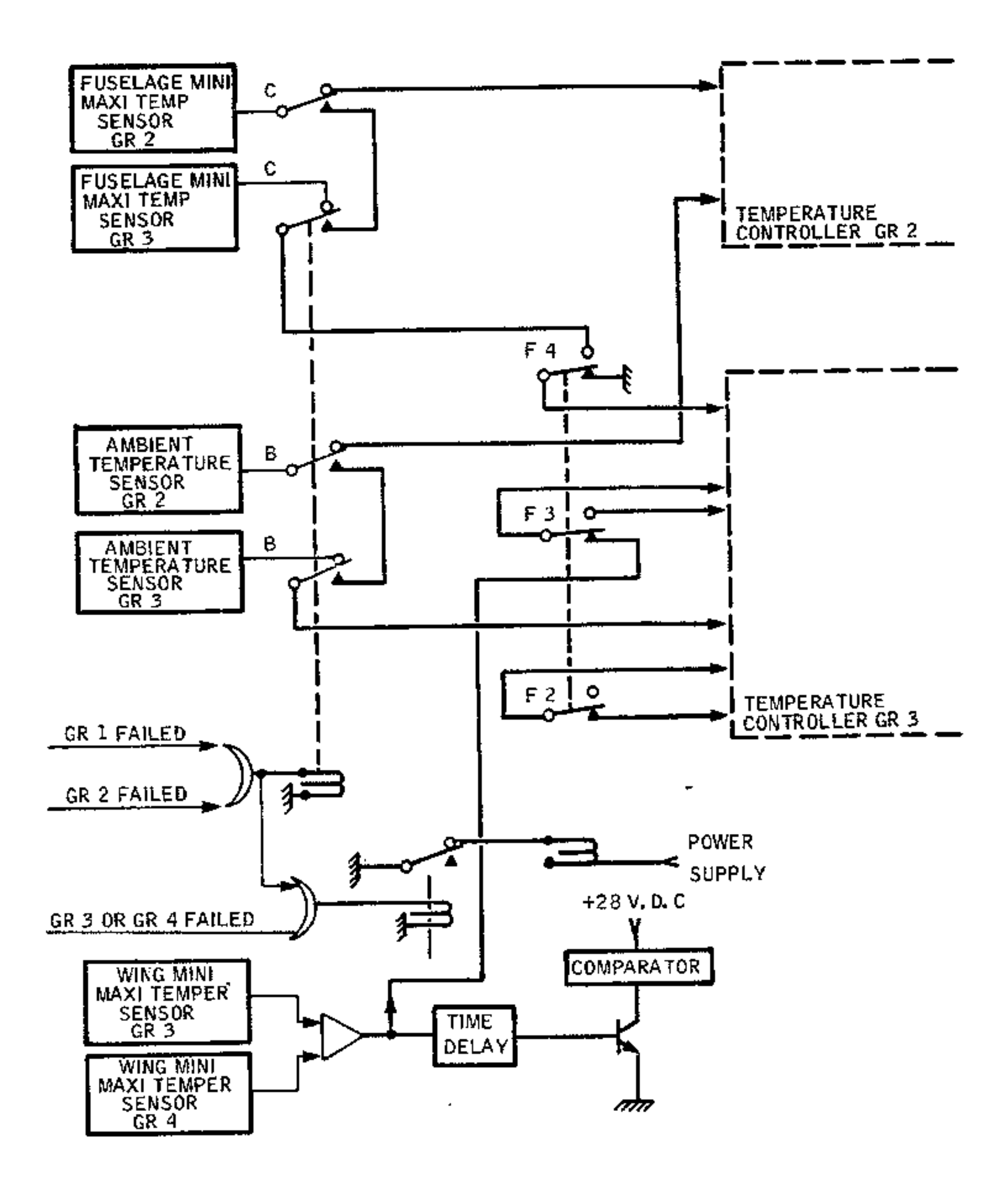
13. Comparison Unit (Ref. Fig. 003)

A. Description

Refer to 21-61-00, Description and Operation.

B. Operation

Under normal conditions of operation (AUTO mode selected with comparison function), the temperature selector of group 4 controls the temperature control valves of groups 3 and 4.
In this case, the comparison unit receives signals from the fuselage mini-maxi temperature sensors of groups 3 and 4.
Any variation in temperature is amplified and sent to the motor of group 3 temperature control valve. This valve opens or closes so as to reduce the variation. If a temperature control failure appears, the comparison unit activates



CMA 21 63 00 0 AEMO

GR3 and GR4 Section of Comparison Unit - Schematic
Figure 003

COMPARATOR indicator light which comes on at panel 2-214. If COMPARATOR light comes on, it is necessary to place Group 3 or 4 switch in FAILED position. This action de-energizes relays F. The temperature controllers are no longer dependent on each other and each group (groups 3 and 4) becomes independent. The temperature selector of group 3 operates group 3 through temperature controller 3 and the temperature selector of group 4 operates group 4 through temperature controller 4.
In the event of failure of group 1 or 2, in addition to various switchings inside the comparison unit concerning to these groups (Ref. 21-61-00, Description and Operation and 21-62-00, Description and Operation), relays F are de-energized, resulting in independence of groups 3 and 4.

NOTE : When the temperature control of group 3 or 4 is manually operated (relevant temperature selector placed in STANDBY position), the part of the comparison unit associated with this group is inoperative.

14. Indicator - Ambient Temperature

The aft cabin ambient temperature indicator located on Flight Engineer's panel 2-214 reads temperature in the aft cabin. It is identical to the ambient temperature indicator of the flight compartment (Ref. 21-61-00, Description and Operation).

15. Operation

A. Normal operation (interconnection of groups 3 and 4 in AUTO mode). (Ref. Fig. 004)

Normal operation of aft cabin temperature control system is automatic. Normally the conditioning air is bled from groups 3 and 4.
Two cases are possible in automatic operation :

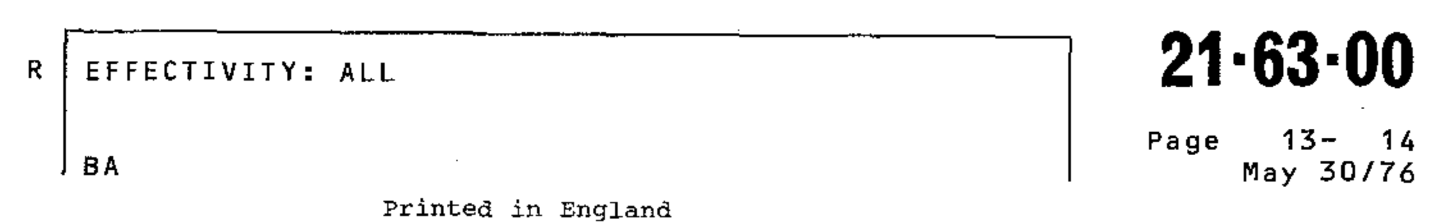
- operation with comparison function (groups 3 and 4 interconnected)
- operation without comparison function (groups 3 and 4 disconnected).

(1) Automatic operation with comparison function

In this configuration relay F in comparison unit is energized and relays B and C de-energized. The temperature selector of group 3 must be in one of the positions of the AUTO range, in order to supply group 3 temperature controller amplifier which in turn supplies group 3 temperature control valve.

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R Aft Cabin Temperature Control - Normal Operation
Figure 004



R EFFECTIVITY: ALL

BA

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The temperature selector of group 4 placed in one position of the AUTO range, wafer A switches a 115 Volts, 400 Hz signal to group 4 temperature controller and wafer B switches various resistances according to aft cabin required temperature.
The resulting signal is compared to the signal transmitted by ambient temperature sensor H1047 and any variation is amplified through amplifier A1 of group 4 temperature controller.
This signal is modified in the temperature controller by signals received :

- either from the fuselage mini-maxi temperature sensor H1043 (group 4)

- or from wing mini-maxi temperature sensor H1051 (group 4).
  The error signal amplified by amplifier A2 inside the temperature controller is sent to the T.C.V. automatic control motor until there is no variation between the temperature desired and the actual temperature. At the same time the output signal from controller amplifier A2 is grounded by relay F3 which is energized.
  The signals transmitted by wing mini-maxi temperature sensors of groups 3 and 4 are compared and the resulting error signal is sent through relay F3 to T.C.V automatic control motor of group 3. The ambient pressure switch H1035 of group 4 ensure :
  - below 30,000 feet, a temperature of the mixed air between +5°C and +80°C.
  - above 30,000 feet, a temperature of the mixed air between -30°C and +80°C

  Additionally, the ambient pressure switch of group 4 or 3 allows a signal to be sent to group 4 temperature controller in case of signs of icing in the mixing duct above 30,000 feet until ice has disappeared.

  In the event of failure of the comparison unit, the components inside comparison unit transmit a signal which activates COMPARATOR light on Flight Engineer's panel.

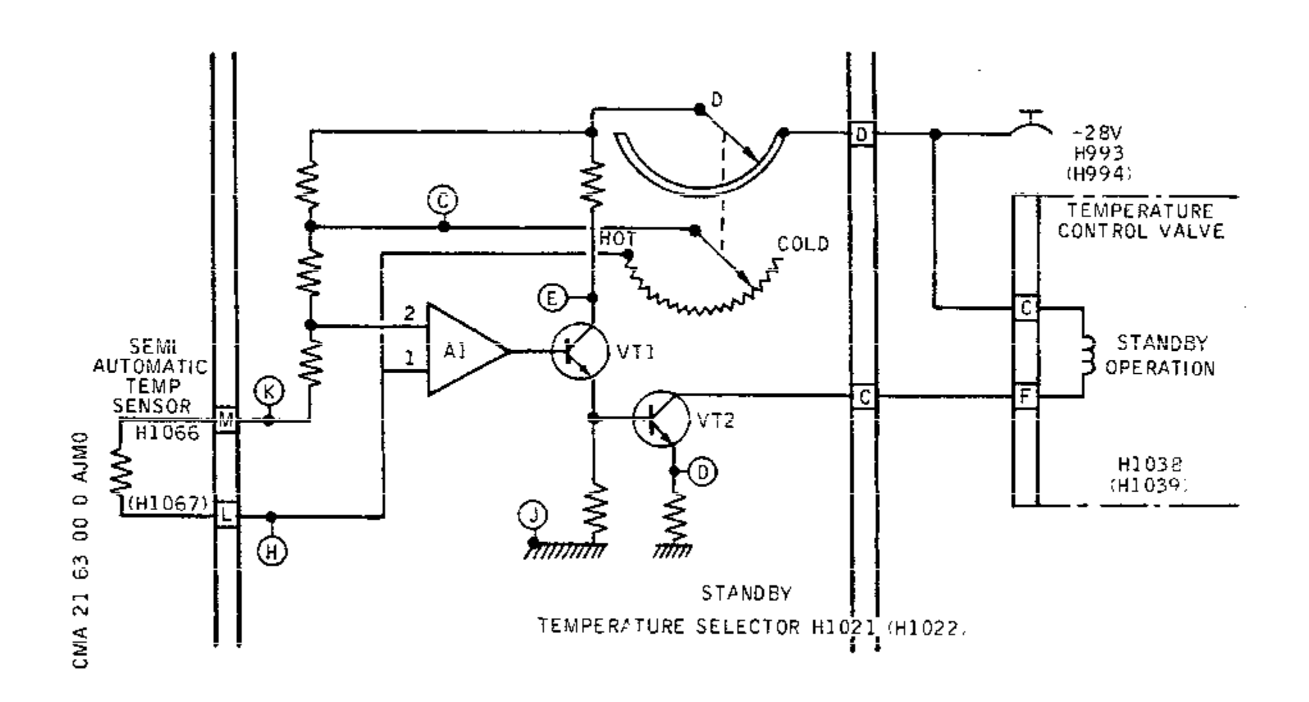
(2) Automatic operation without comparison function (groups 3 and 4 disconnected).

If COMPARATOR indicator light comes on, it is necessary to place Group 3 or 4 switch on panel 2-214 in FAILED position

This action :
- cuts off supply to comparison unit
- de-energizes relay F

Each temperature controller receives signals from the associated temperature selector and groups 3 and 4 operate independently from each other, temperature control thus being a function of the temperature set at each temperature selector in the AUTO range.

B. Manual operation of a group (STANDBY mode) (Ref. Fig. 005)



Aft Cabin Temperature Control Operation in STANDBY Mode
Figure 005

In the event of groups 3 and 4 operating independently in automatic temperature control, if one group fails temperature control can be performed manually in STANDBY mode. The relevant temperature selector H1021 (group 3) or H1022 (group 4) must be placed in one position of the STANDBY range. This action :
- cuts off 115V, 400Hz supply to the associated temperature controller which is switched off.

- switches on 28V to the STANDBY circuit of the temperature selector.
- switches a resistance of the selector at amplifier A1 input.
- activates sensor H1066 (group 3) or H1067 (group 4).

Any difference between the mixed air required temperature and the actual temperature in the duct (semi-automatic temperature sensor H1066 for group 3 or H1067 for group 4) produces a difference of potential at amplifier A1 input.
The output signal unlocks transistor VT2. The temperature control valve is then activated by its manual control motor (operation in STANDBY mode) until the difference in temperature is nil.

C. Failure of Air Conditioning Group 3 or 4
(Ref. Fig.006 and 007)

(1) Operation

In the event of failure of group 3 or 4 due to a faulty component located between the temperature control valve and the cabin inlet safety valve, there is no possibility of bleeding air from the adjacent engine through the crossbleed valve.
Group 3 (4) is no longer serviceable. It is then necessary on panel 2-214 :

- to place BLEED VALVES ENG3 (BLEED VALVES ENG4) switch in SHUT position and COND VALVE ENG3 (COND VALVE ENG4) switch in OFF position and the three other COND VALVE switches in BOOST position.

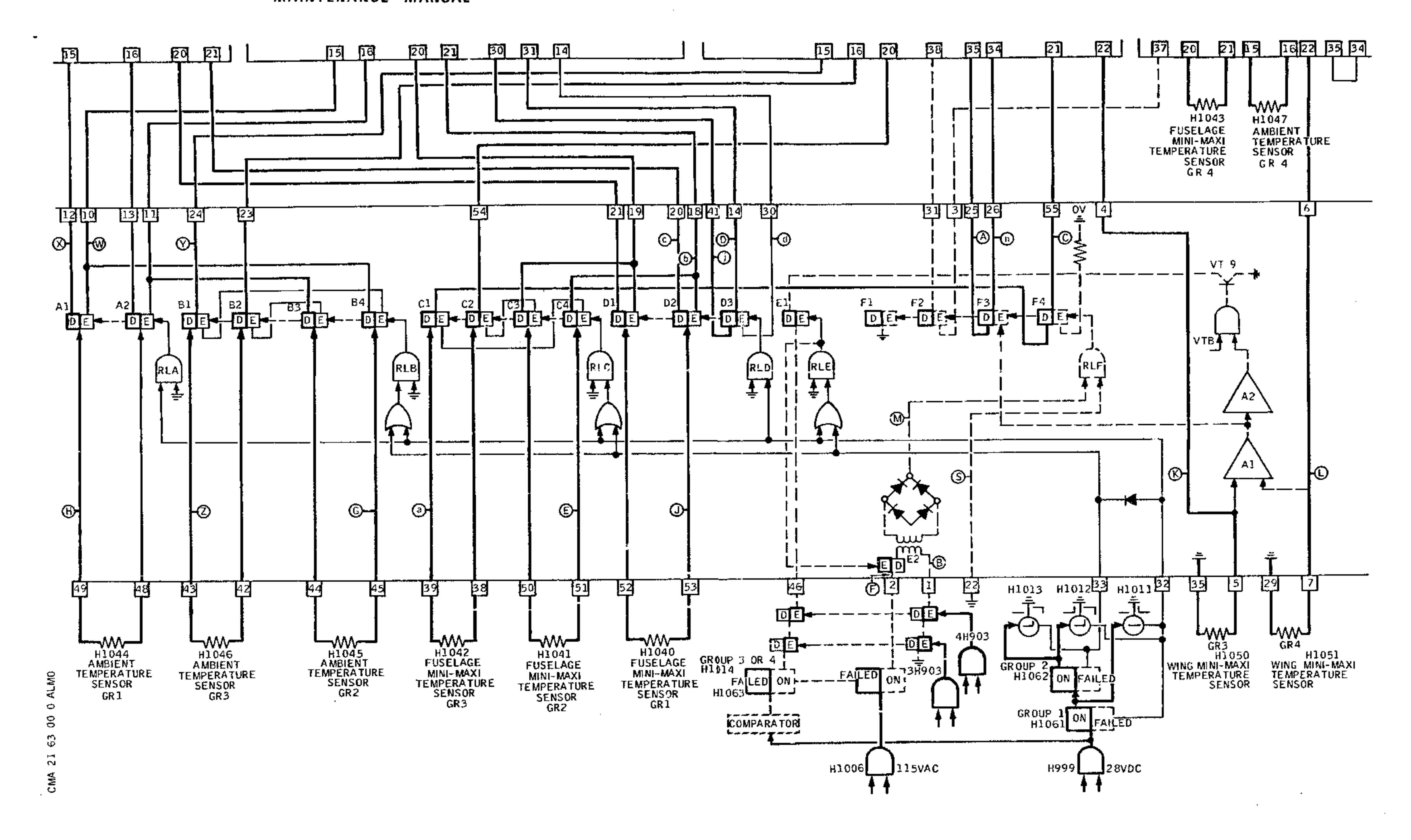
This has the effect of :

- disconnecting group 3 from group 4
- switching off faulty group temperature controller. Aft cabin air conditioning is thus ensured by group 4 (group 3) and its associated temperature control system.
  Flight compartment and forward cabin temperature control systems undergo no change.

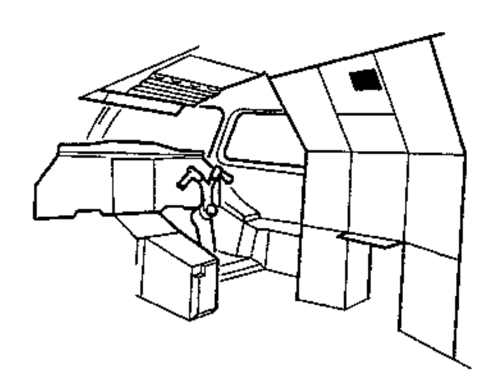
(2) Indicating

Magnetic indicator No.3 on panel 2-214 remains in its initial position.
- the flow and temperature indicator lights of the faulty group read zero.

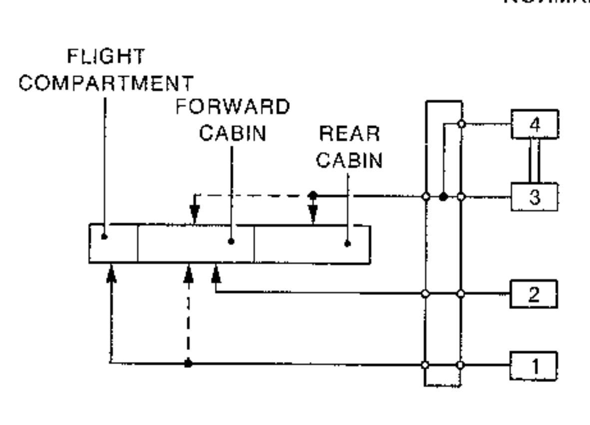
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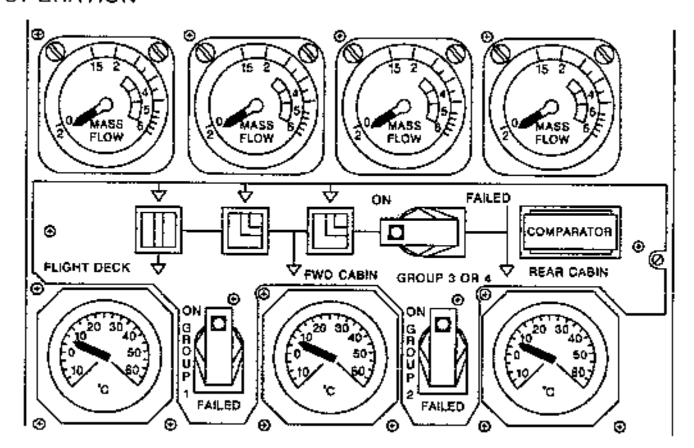


Group 3 or 4 Failure - Switching
Figure 006

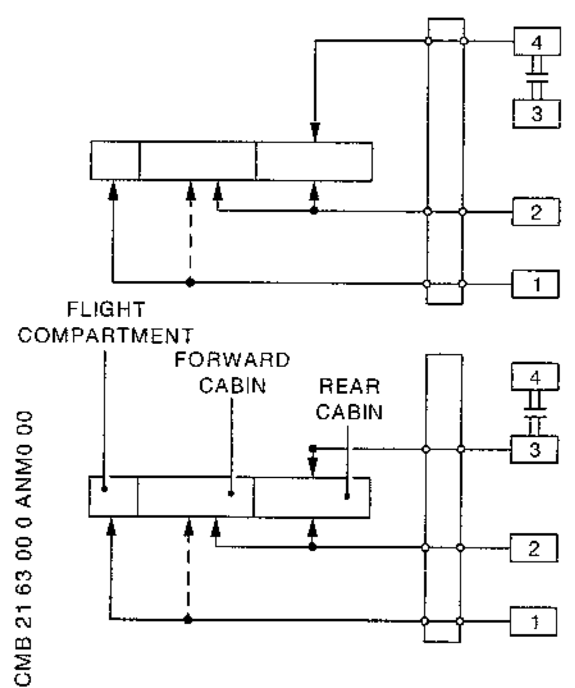


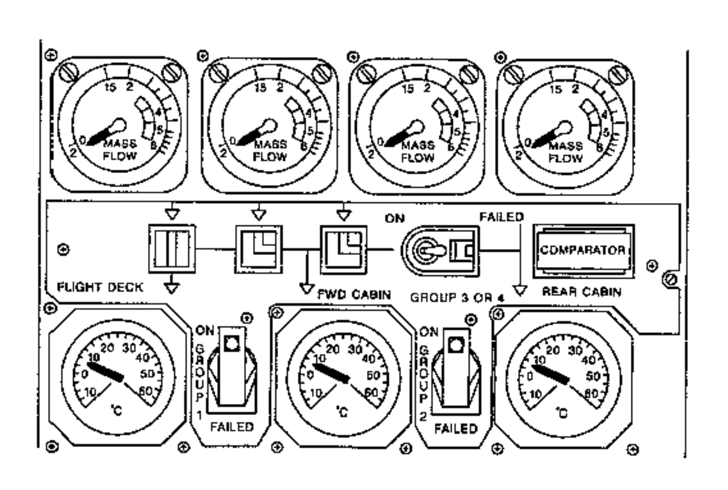
NORMAL OPERATION





CASE OF FAILURE OF GROUP 3 OR 4





Indicating System
Figure 007

AFT CABIN TEMPERATURE CONTROL - INSPECTION/CHECK

1. Sampling Duct Fan Screen

A. Inspection/Check

(1) Make certain that screen is clean ; clean if necessary.

(2) Open LH hatrack at frame 54.

(3) On upper part of sampling duct fan protective cover, make certain that screen is clean and free from dust.

(4) If screen is clogged, clean it with a clean, dry and soft brush.

(5) Clean the inside of the hatrack if necessary.

(6) Close hatrack.

AMBIENT PRESSURE SWITCH - REMOVAL/INSTALLATION

1. General

The removal/installation procedure for pressure switches H1034, H1035 is dealt with in : 21-61-11, R/I.

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AMBIENT PRESSURE SWITCH - ADJUSTMENT/TEST

1. General

The test of ambient pressure switches H1034 and H1035 is dealt with in :

21-61-11, A/T

AMBIENT TEMPERATURE INDICATOR - REMOVAL/INSTALLATION

1. General

Aft cabin ambient temperature indicator 3D163 is located on Flight Engineer panel 2-214.

2. Flight Compartment Ambient Temperature Indicator 3D163

A. Equipment and Materials

DESCRIPTION	PART NO.
Not Applicable	

B. Prepare

WARNING : AS A SAFETY MEASURE AND IN ORDER TO TAKE ALL NECESSARY PRECAUTIONS AGAINST INADVERTENT OPERATIONS, DISPLAY A WARNING NOTICE ON THE ELECTRICAL GROUND CONNECTOR PROHIBITING ENERGIZATION OF THE AIRCRAFT ELECTRICAL NETWORK.

(1) On EMERG GEN Flight Engineer panel 6-214, make certain that BATT A and BATT B switches are in OFF position.

WARNING : AS A SAFETY MEASURE AND IN ORDER TO TAKE ALL NECESSARY PRECAUTIONS AGAINST INADVERTENT OPERATIONS, DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF BATT A AND BATT B SWITCHES.

(2) At Flight Engineer station, open panel 2-214 (12 1/4 turn fasteners).

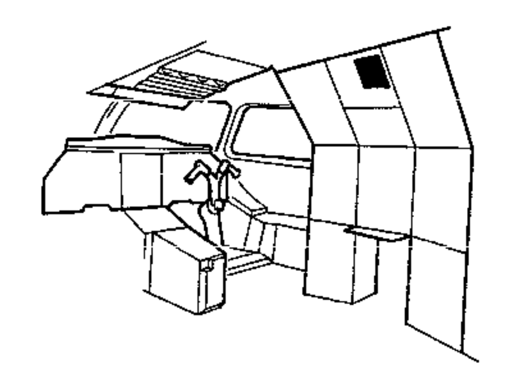
C. Remove

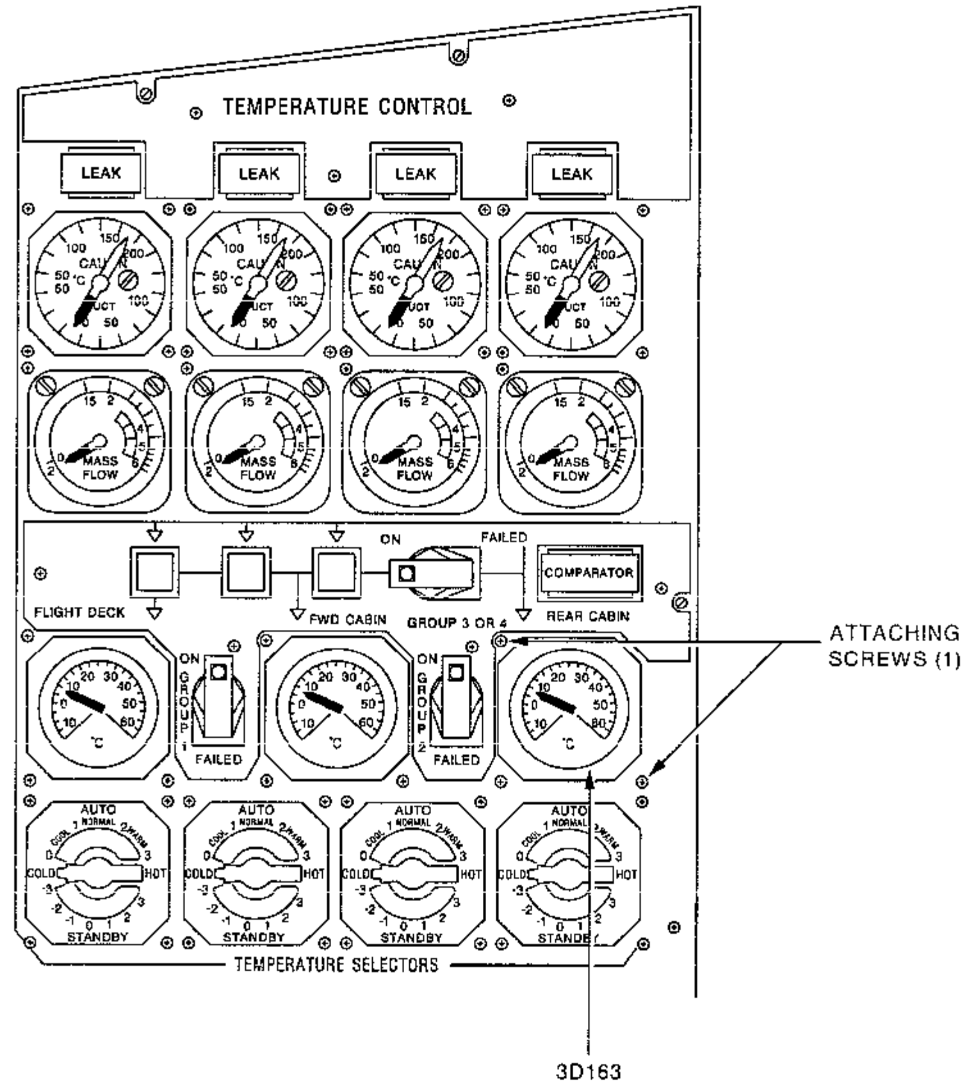
(1) At Flight Engineer station on TEMPERATURE CONTROL panel, disconnect connector (1D163A) from temperature indicator.

(2) Hold indicator with one hand and unscrew both attaching screws (1) (located on front face of panel).

(3) Remove the indicator

D. Preparation of Replacement Component





CMB 21 63 12 4 AAM0 00

Location of Ambient Temperature Indicator (3D163)
Figure 401

(1) Make certain that the indicator shows no dents or scratched paint.

(2) Remove protective cap from electrical connector ; make certain that pins are neither distorted nor damaged.

E. Install

(1) Install indicator on panel (on front face) screw both attaching screws.

(2) Connect electrical connector (3D163A) to ambient temperature indicator 3D163.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(3) Close Flight Engineer panel 2-214 (12 1/4 turn fasteners).

B F. Deleted

G. Close-Up

(1) Remove warning notices from :

(a) Ground connector,

(b) EMERG GEN panel.

AMBIENT TEMPERATURE INDICATOR - ADJUSTMENT/TEST

1. Functional Test of Ambient Temperature Indicator

A. General

The purpose of the test is to check that REAR CABIN ambient temperature indicator operates correctly.

B. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Decade Resistance Box	
Circuit Breaker Safety Clips	
L Test Electrical Connector	

C. Prepare (Ref. Fig. 501)

(1) Trip, safety and tag the following circuit breaker.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
REAR CABIN TEMP IND	15-215	3D 161	C 3

(2) Gain access to ambient temperature sensor (Ref. 21-63-21, Page 401, R/I)

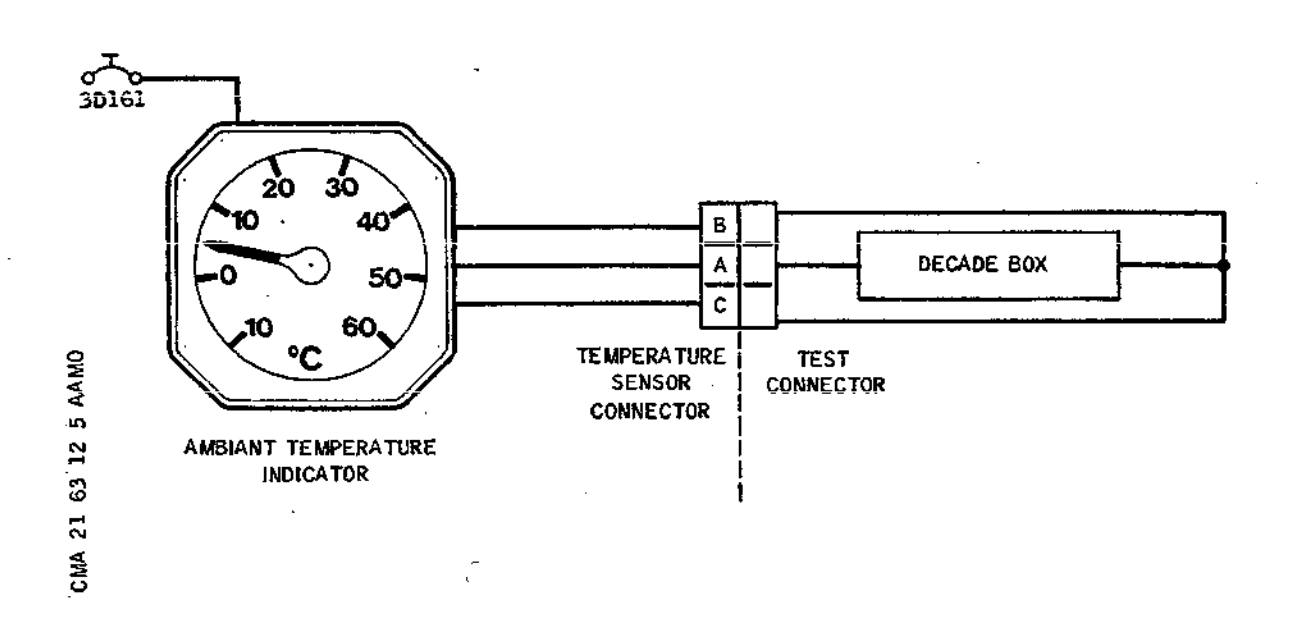
(3) Disconnect electrical connector from ambient tenperature sensor (3D165)

(4) Connect decade box to aircraft wiring according to the figure

(5) Select a value of 124.85 ohms on decade resistance box

(6) Set REAR CABIN TEMP IND circuit breaker

(7) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, S)



Ambient Temperature Indicator Test
Figure 501

D. Test

(1) On decade box select resistance values according to table below and check that REAR CABIN ambient temperature indicator indicates the corresponding value.

TEMPERATURE °C	-10	0	10	20	30	40	50	60
DECADE BOX RESISTANCE	124.85	130	135.13	140.25	145.35	150.44	155.51	160.56

NOTE : Tolerance on FLIGHT DECK temperature indicator is :

± 1.5°C in + 10°C to 30°C range
± 3°C out of this range

(2) Increase resistance value on resistance box until ambient temperature indicator pointer reaches maximum

stop.
Disconnect electrical wire between A terminal of test connector and decade box. Indicator pointer must remain on maximum stop.

(3) Trip the following circuit breaker

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
REAR CABIN TEMP IND	15-215	3D 161	C 3

(4) Temperature indicator pointer must position below the first graduation.

E. Close Up

(1) Disconnect test connector from ambient temperature sensor. Remove decade box

(2) Reconnect ambient temperature sensor 3D165 electrical connector

(3) Install cover and close hatrack (Ref. 21-63-21, D/O)

(4) Reset REAR CABIN TEMP IND circuit breaker

(5) De-energize the aircraft electrical network and disconnect electrical ground power unit.

DUAL AIR CONDITIONING TEMPERATURE INDICATOR REMOVAL/INSTALLATION

1. General

Dual air conditioning temperature indicators 3D164, 4D164 are identical. They are located on TEMPERATURE CONTROL Flight Engineer panel 2-214. The removal installation procedure is the same for each of them.

2. Dual Air Conditioning Temperature Indicator 3D164 - 4D164

A. Equipment and Materials

DESCRIPTION	PART NO.
Not Applicable	

B. Prepare

WARNING : AS A SAFETY MEASURE AND IN ORDER TO TAKE ALL NECESSARY PRECAUTIONS AGAINST INADVERTENT OPERATIONS, DISPLAY A WARNING NOTICE ON THE ELECTRICAL GROUND CONNECTOR PROHIBITING ENERGIZATION OF THE AIRCRAFT ELECTRICAL NETWORK.

(1) On EMERG GEN Flight Engineer panel 6-214, make certain that BATT A and BATT B switches are in OFF position.

WARNING : AS A SAFETY MEASURE AND IN ORDER TO TAKE ALL NECESSARY PRECAUTIONS AGAINST INADVERTENT OPERATIONS, DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF BATT A AND BATT B SWITCHES.

(2) At Flight Engineer Station, open panel 2-214 (12 1/4 turn fasteners).

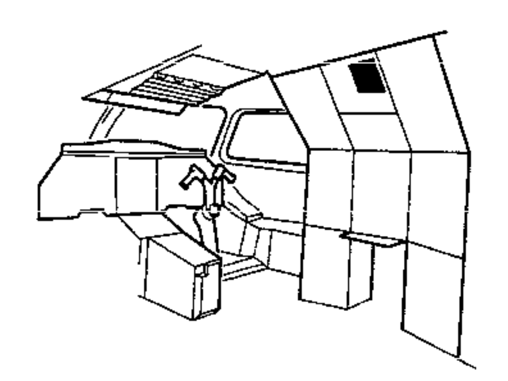
C. Remove

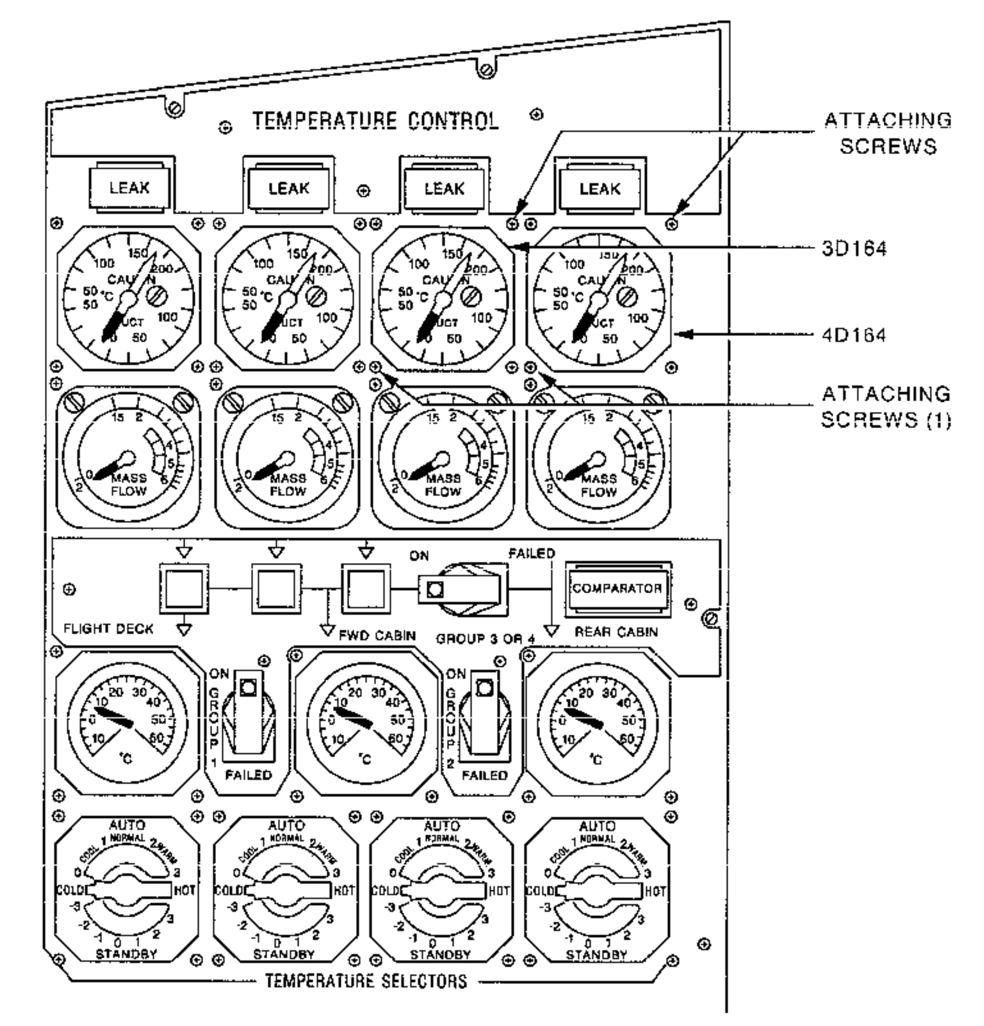
(1) On TEMPERATURE CONTROL panel 2-214. disconnect electrical connector 3D164A or 4D164A according to indicator removed.

(2) Hold indicator with one hand ; unscrew both attaching screws (1) (located on face of panel).

(3) Remove indicator.

Printed in England





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Location of Dual Air Conditioning Temperature Indicator 3D164 - 4D164
Figure 401

D. Preparation of Replacement Component

(1) Make certain that the indicator shows no dents or scratched paint.

(2) Remove protective cap from electrical connector ; make certain that pins are neither distorted nor damaged.

E. Install

(1) Install indicator on panel (on front face). Screw both attaching screws.

(2) Connect electrical connector 3D164A or 4D164A according to indicator removed.

CAUTION : MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(3) Close panel 2-214 (12 1/4 turn fasteners).

B F. Test

B Check for correct operation by comparison with indicators
B of other groups.

G. Close-Up

(1) Remove warning notices :

(a) From ground connector

(b) From EMERG GEN panel.

DUAL AIR CONDITIONING TEMPERATURE INDICATOR - ADJUSTMENT/TEST

1. General

The dual air conditioning temperature indicator 3D164, 4D164 test procedure is dealt with in the following topic : 21-61-16, A/T.

TEMPERATURE CONTROL VALVE POSITION INDICATOR - REMOVAL/INSTALLATION

1. General

The removal/installation of group 3 and 4 indicators (H 1017, H 1018) is dealt with in 21-61-17.

Printed in England

TEMPERATURE CONTROLLER - REMOVAL/INSTALLATION

1. General

The removal/installation of the temperature controllers is dealt with in 21-61-21.

PRINTED IN ENGLAND

TEMPERATURE SELECTOR - REMOVAL/INSTALLATION

1. General

Temperature selectors are located on Flight Engineer TEMPERATURE CONTROL panel 2-214. They are identical.

The removal installation procedure is identical for each of them.

R 2. Temperature Selector H1021 and H1022

R

R A. Prepare

WARNING: AS A SAFETY MEASURE AND IN ORDER TO TAKE ALL NECESSARY PRECAUTIONS AGAINST INADVERTENT OPERATIONS, DISPLAY A WARNING NOTICE ON THE ELECTRICAL GROUND CONNECTOR PROHIBITING ENERGIZATION OF THE AIRCRAFT ELECTRICAL NETWORK.

(1) On EMERG GEN Flight Engineer panel 6-214, make certain that BATT A and BATT B switches are in OFF position.

WARNING: AS A SAFETY MEASURE AND IN ORDER TO TAKE ALL NECESSARY PRECAUTIONS AGAINST INADVERTENT OPERATIONS, DISPLAY A WARNING NOTICE ON PANEL 6-214 PROHIBITING OPERATION OF BATT A AND BATT B SWITCHES.

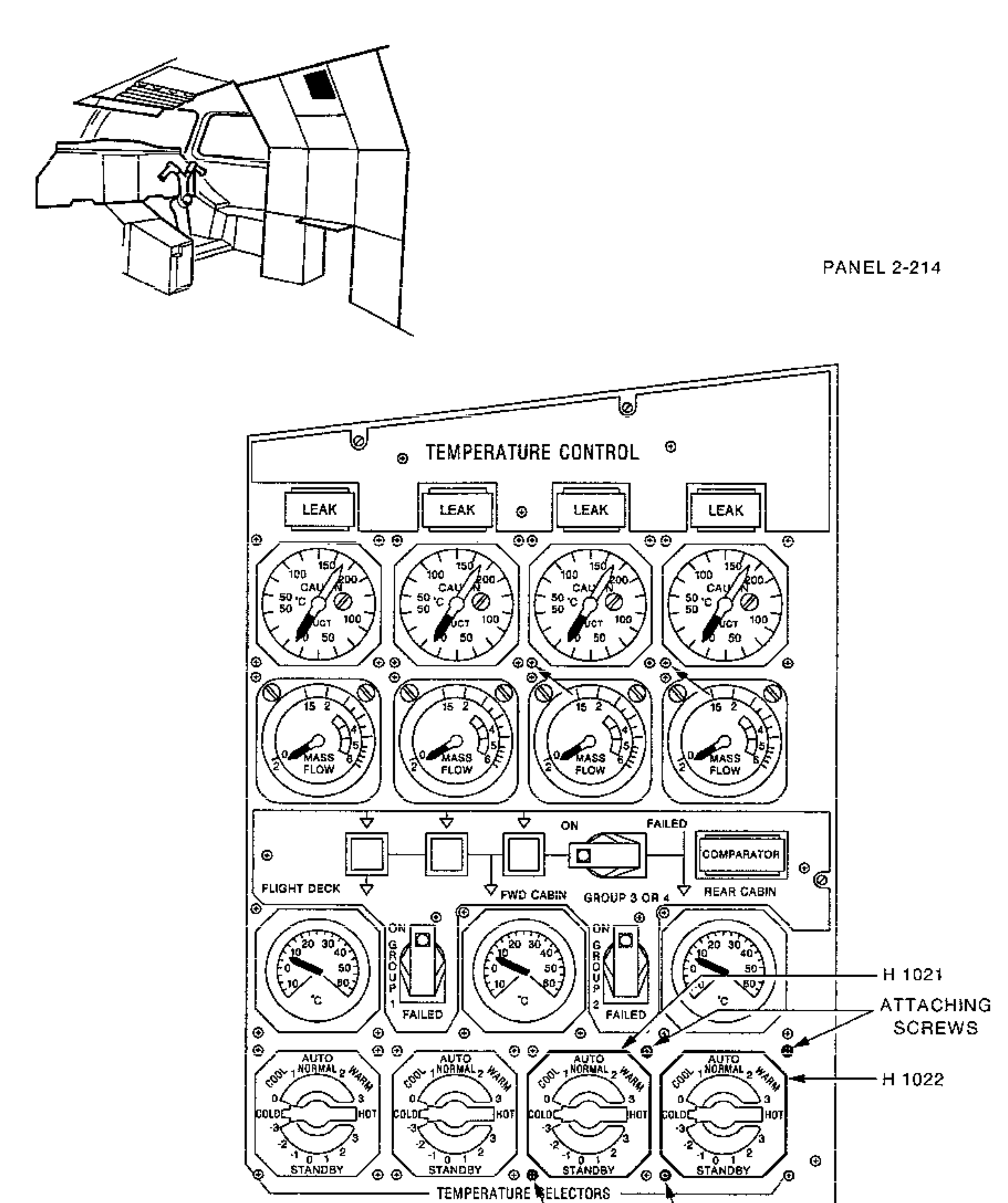
(2) At Flight Engineer station, open TEMPERATURE CONTROL panel 2-214 (12 screws at 1/4 turn).

R B. Remove

(1) On Flight Engineer TEMPERATURE CONTROL panel unscrew connector H1021A or H1022A according to selector removed.

(2) Unscrew the attaching screws (access through forward face of panel) while holding selector with one hand.

(3) Remove temperature selector.



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Location of Temperature Selectors H1021 and H1022
Figure 401

R C. Preparation of Replacement Component

(1) Make certain that selector shows no dents or scratched paint.

(2) Remove protective cap from electrical connector. Make certain that pins are neither distorted nor damaged.

R D. Install

(1) Install selector on panel screw attaching screws (located on front face of panel).

(2) Connect electrical connector H1021A or H1022A according to selector removed.

CAUTION: MAKE CERTAIN THAT WORKING AREA IS CLEAN AND CLEAR OF TOOLS AND MISCELLANEOUS ITEMS OF EQUIPMENT.

(3) Close TEMPERATURE CONTROL panel 2-214 (12 1/4 turn fasteners).

R

R E. Close-Up

(1) Remove the warning notices from:

(a) Ground electrical connector,

(b) EMERG GEN panel.

AMBIENT TEMPERATURE SENSOR - REMOVAL/INSTALLATION

R **ON A/C 006-007,

1. General (Ref. Fig. 401)

The ambient temperature sensor 3D165 is located in LH hatrack forward of frame 54.

R **ON A/C 001-005,

1. General (Ref. Fig. 402)

The ambient temperature sensor is located in LH hatrack aft of frame 54

2. Ambient Temperature Sensor

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Electrical Ground Power Unit	
Thermometer (degrees centigrade)	

B. Prepare

(1) Trip, safety and tag the following circuit breaker

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
REAR CABIN TEMP IND	15-215	3D 161	C 3

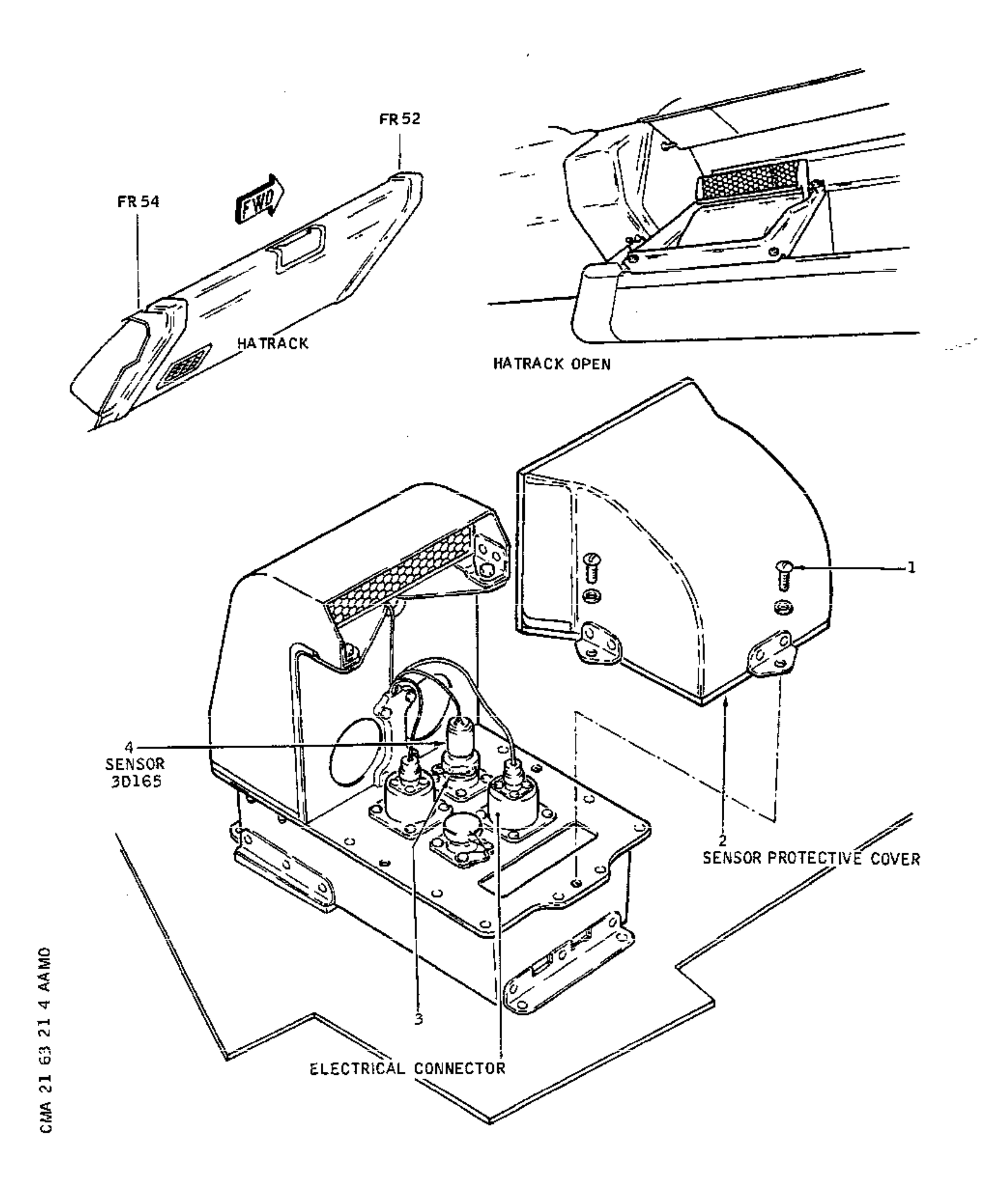
(2) Open LH hatrack.

(3) Unscrew the 3 screws (1) attaching sensor cover (2)

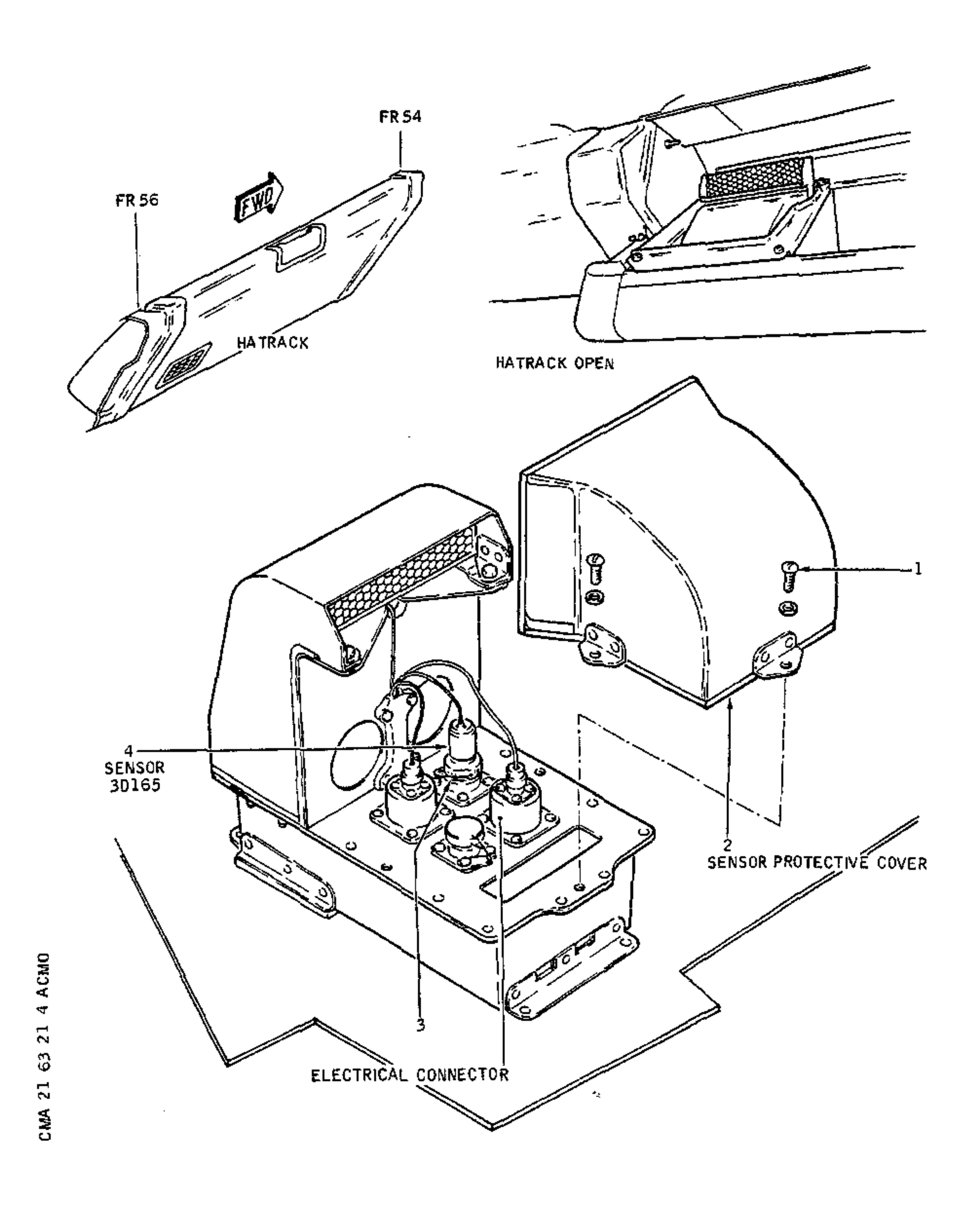
C. Remove

(1) Cut ambient temperature sensor lockwire (3)

(2) Disconnect temperature sensor electrical connector



Ambient Temperature Sensor
Figure 401



Ambient Temperature Sensor
Figure 402

(3) Unscrew temperature sensor, remove seal

D. Preparation of Replacement Component

(1) Make certain that electrical connector is in good condition (on aircraft wiring side and on temperature sensor side)

(2) Check that temperature sensor is free from dents or traces of corrosion

E. Install

(1) Install a seal and offer up temperature sensor in its location

(2) Tighten and wirelock temperature sensor

(3) Connect electrical connector

B F. Deleted

G. Close Up

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit

(2) Install sensor cover (2). Tighten the 3 screws (1)

(3) Make certain that hatrack is clean and clear of tools and miscellaneous items of equipment

(4) Close hatrack.

SAMPLING DUCT FAN - REMOVAL/INSTALLATION

**ON A/C 005-007,
1. General (Ref. Fig. 401)

These fans are located in LH hatrack forward of frame 54.

**ON A/C 001-004,
1. General (Ref. Fig. 402)

These fans are located in LH hatrack aft of frame 54.

2. Sampling Duct Fan

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clip	-

B. Prepare

(1) Trip, safety and tag one of the following circuit breakers:

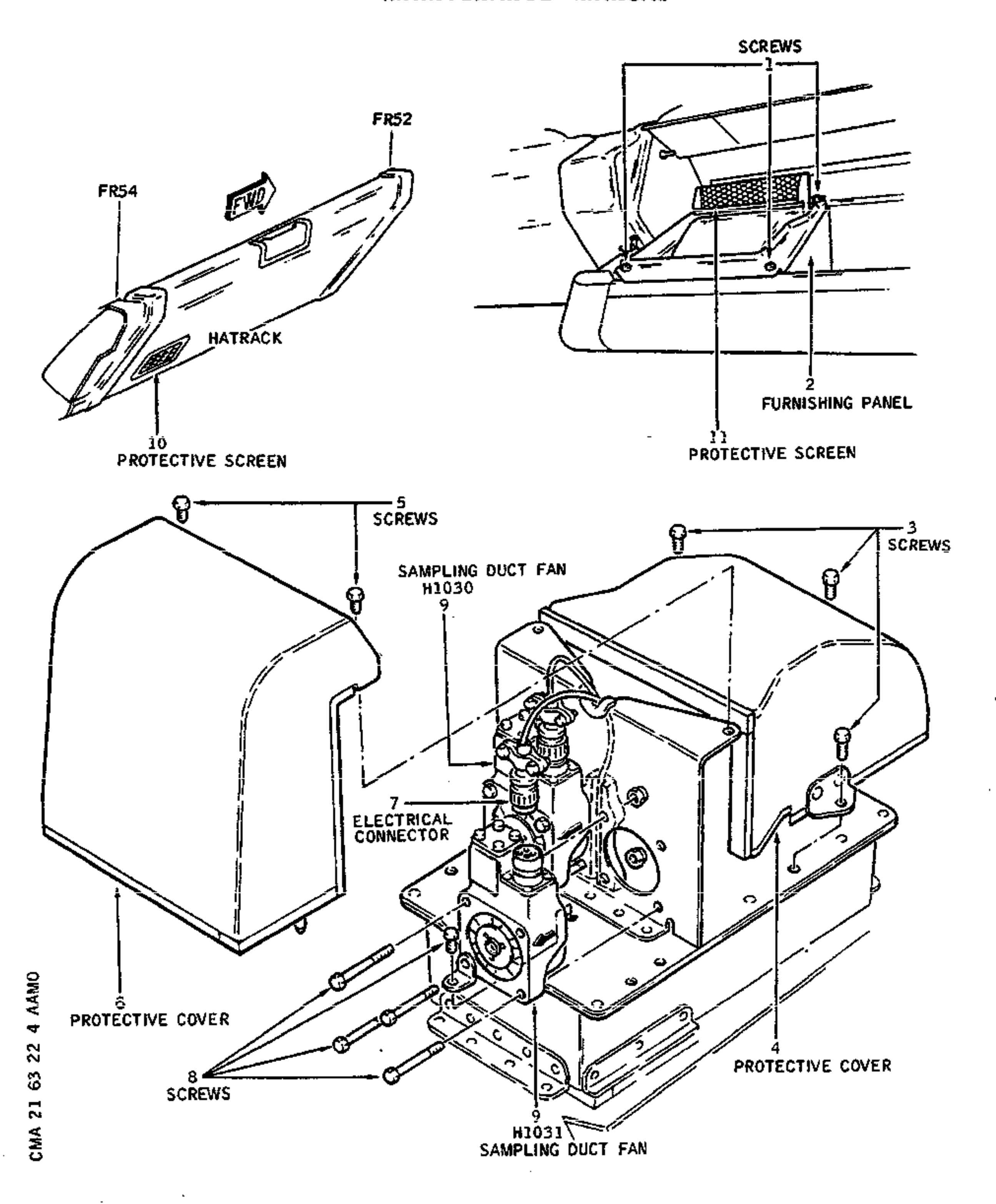
SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 3 - Fan H1030 GRP 3 TEMP SELECTOR AUTO SUP & CONT	2-213	H1002	D 3
R Group 4 - Fan H1031 GRP 4 TEMP SELECTOR AUTO SUP & CONT	4-213	H1003	B12

C. Remove

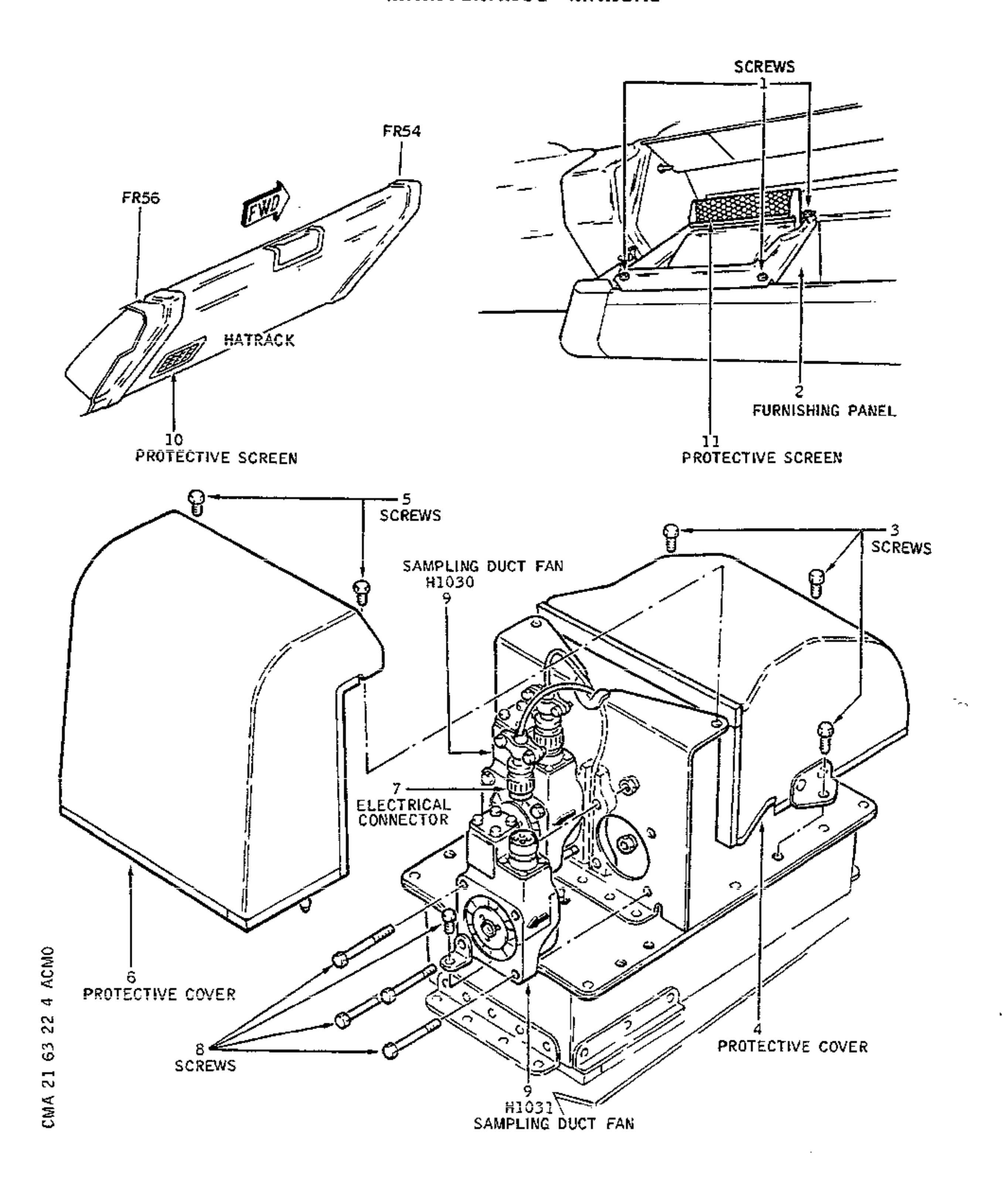
(1) Open hatrack located in zone 231 between frames 53 and 56.

(2) Remove screws (1) and furnishing panel (2).

R (3) Remove screws (3) and sensor protective cover (4).



Sampling Duct Fan
Figure 401



Sampling Duct Fan
Figure 402

R (4) Remove screws (5) and fan protective cover (6).

R (5) Remove electrical connector (7) from sampling duct fan.

R (6) Remove screws (8) and sampling duct fan (9). Retain nuts and washers located on fairlead side.

D. Install

R (1) Install sampling duct fan (9). Attach with screws (8) washers and nuts on fairlead side.

NOTE: Install fan with arrow in direction of required airflow.

R (2) Connect electrical connector (7).

R (3) Install fan protective cover (6), attach with screws (5).

R
R (4) Install sensor protective cover (4), attach with screws (3).

R (5) Install furnishing panel (2), attach with screws (1).

(6) Close hatrack.

E. Test

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(2) Remove safety clip and tag and reset circuit breaker H1002.

R
R (3) Check that air is drawn in hatrack through protective screen (10) under hatrack and blown towards protective screen (11) inside hatrack.

(4) Remove safety clip and tag and reset circuit breaker H1003.

(5) Trip, safety and tag circuit breaker H1002.

(6) As for group 3 fan, check that air is drawn in hatrack through protective screen (10) under hatrack and blown towards protective screen (11) inside hatrack.

(7) Remove safety clip and tag and reset circuit breaker H1002.

F. Close-Up

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

FUSELAGE MINI-MAXI TEMPERATURE SENSOR - REMOVAL/INSTALLATION

1. General

The fuselage mini-maxi temperature sensor H1042 is located in zone 233 between frames 60 and 61.

2. Fuselage Mini-Maxi Temperature Sensor

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Corrosion Resistant Steel Lockwire Dia. 0.032 (0.8 mm)	

B. Prepare

(1) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GRP3 TEMP SELECTOR AUTO SUP & CONT	2-213	H1002	G16
GRP4 TEMP SELECTOR AUTO SUP & CONT	4-213	H1003	B12

(2) In passenger compartment, open floor panel 234GF.

C. Remove (Ref. Fig. 401)

(1) Disconnect electrical connector (1).

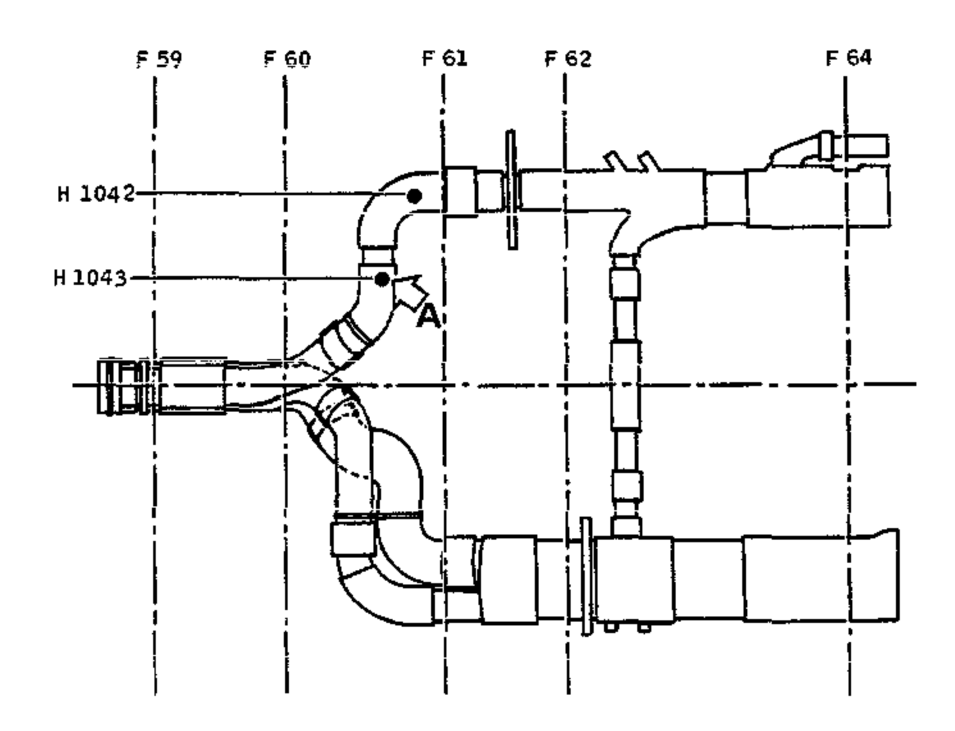
(2) Remove lockwire and screws (2).

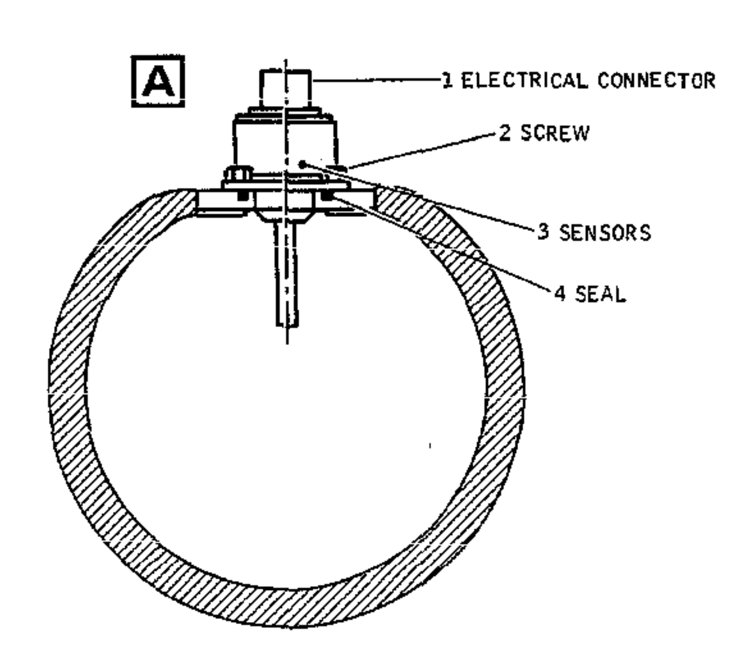
(3) Remove sensor (3) and discard seal (4).

D. Install

(1) Install sensor (3), equipped with a new seal (4).

(2) Install screws (2) and wirelock.





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Fuselage Mini-Maxi Temperature Sensor
Figure 401

R

(3) Connect electrical connector (1).

E. Close-Up

(2) Remove safety clips and tags and reset the circuit breakers tripped in paragraph 2.B (1).

FUSELAGE MINI-MAXI TEMPERATURE SENSOR - REMOVAL/INSTALLATION

1. General

The Removal/Installation of fuselage mini-maxi temperature sensor H1043 is dealt with in :
21-63-23, Removal/Installation

AMBIENT TEMPERATURE SENSOR - REMOVAL/INSTALLATION

**ON A/C 005-007,

1. General (Ref. Fig. 401)

Ambient temperature sensors are located in LH hatrack forward of frame 54.

1. General (Ref. Fig. 402)

Ambient temperature sensors are located in LH hatrack aft of frame 54.

2. Ambient Temperature Sensor

A. Equipment and Materials.

DESCRIPTION	PART NO.
Circuit Breaker Safety Clip	

B. Prepare

(1) Trip, safety and tag one of the following circuit breakers.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Group 3 Sensor H1046 GRP3 TEMP SELECTOR AUTO SUP & CONT	2-213	H1002	B17
Group 4 Sensor H1047 GRP 4 SENSOR H1047 SUP & CONT	4-213	H1003	B12

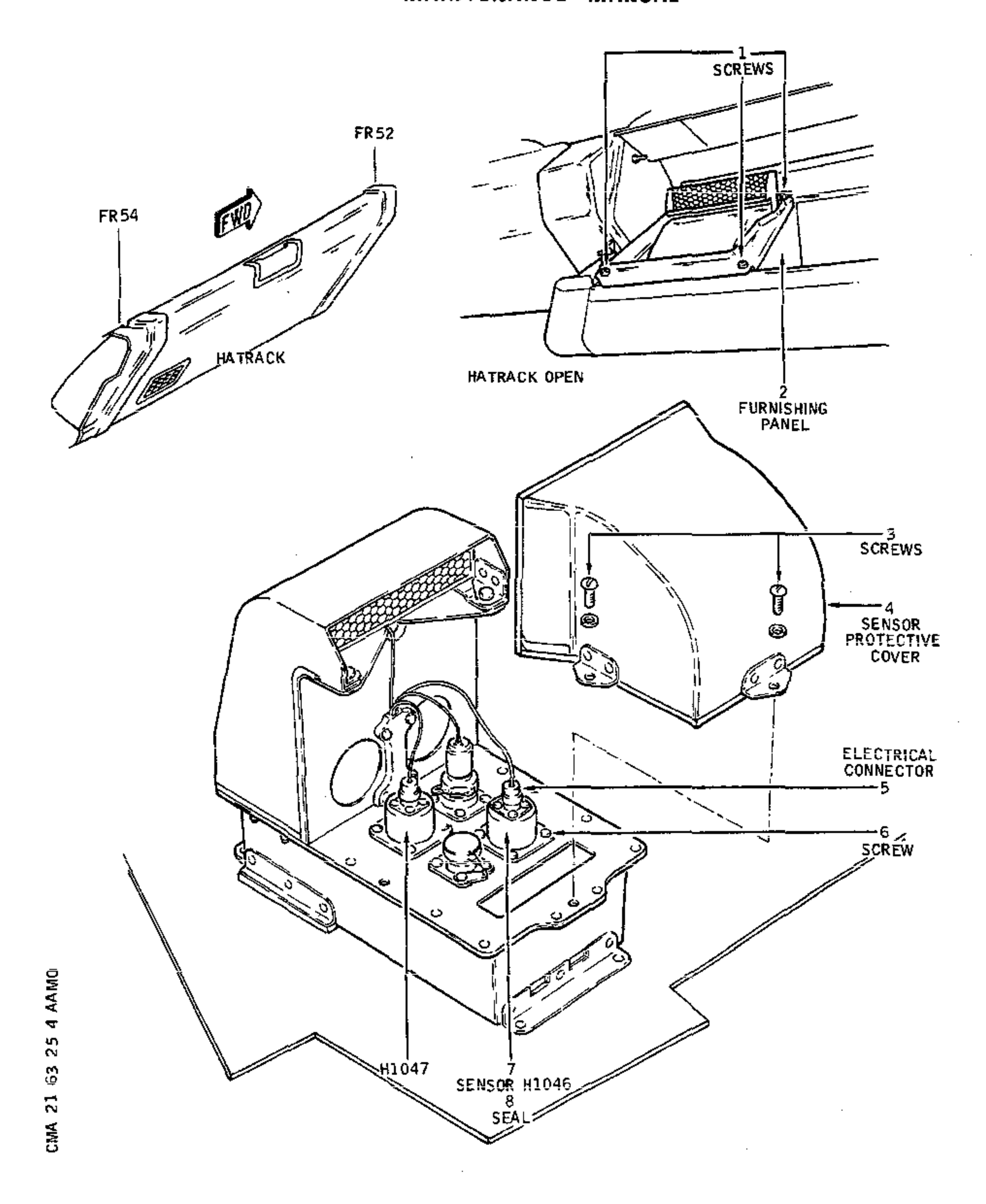
C. Remove

(1) Open hatrack in zone 241 between frames 66 and 68

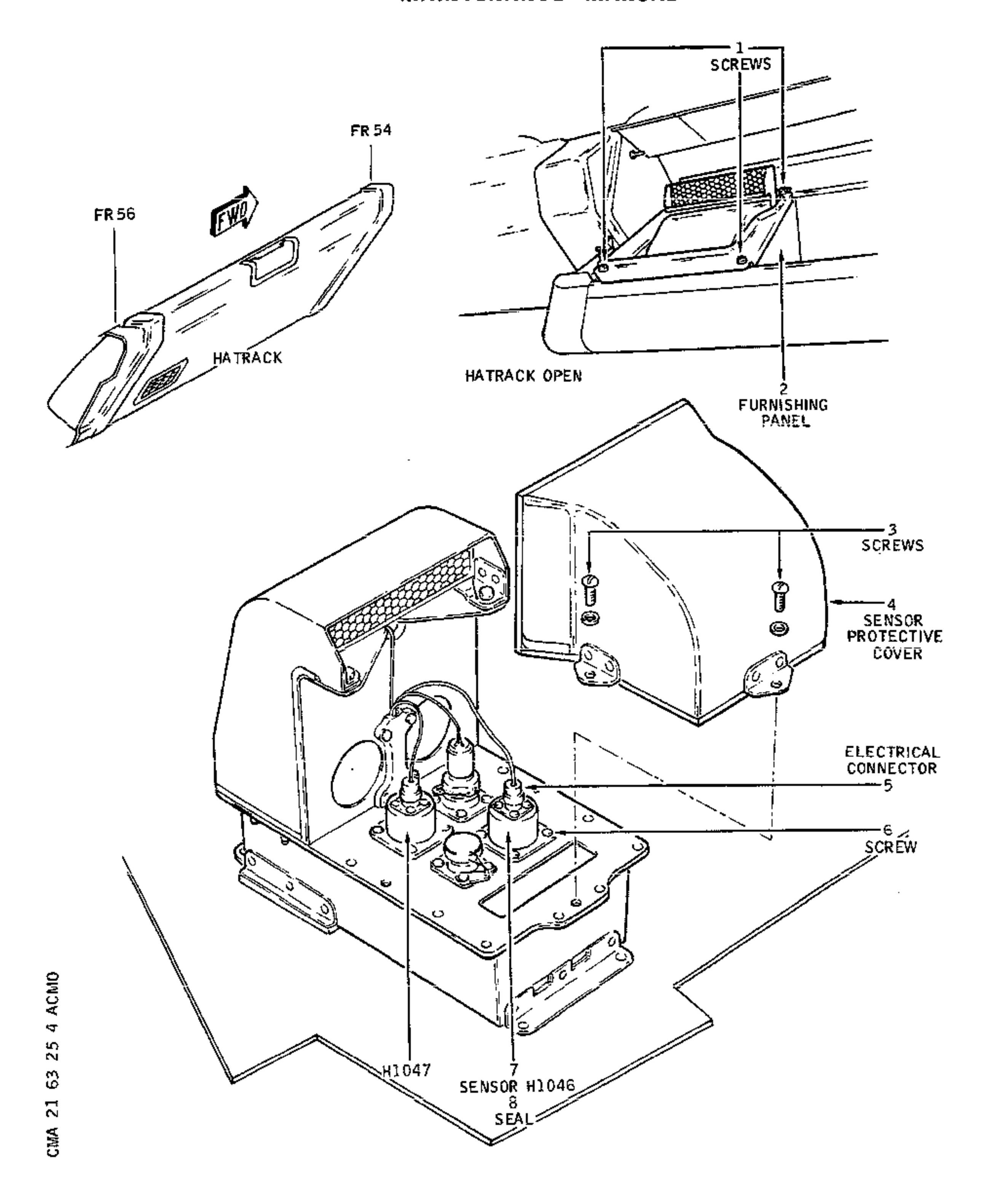
(2) Remove screws (1) and furnishing panel (2)

(3) Remove screws (3) and sensor protective cover (4)

(4) Disconnect sensor electrical connector (5)



Ambient Temperature Sensor
Figure 401



Ambient Temperature Sensor
Figure 402

(5) Remove screws (6) and sensor (7), discard seal (8)

D. Install.

(1) Install sensor (7) fitted with a new seal (8); attach with screws (6)

(2) Connect electrical connector (5)

(3) Install sensor protective cover (4), attach with screws (3)

(4) Install furnishing panel (3); attach with screws (1)

(5) Close hatrack

E. Close-Up

(1) Remove safety clip and tag and reset the circuit breaker tripped in paragraph 2.B. (1)

AMBIENT TEMPERATURE SENSOR - REMOVAL/INSTALLATION

1. General

The removal/installation of ambient temperature sensor H1047, is dealt with in :

21-63-,25, Removal/Installation

TEMPERATURE CONTROL VALVE - REMOVAL/INSTALLATION

1. General

The Removal/Installation of the temperature control valve is
R dealt with in 21-61-31.

TEMPERATURE CONTROL VALVE - ADJUSTMENT/TEST

1. General

The test of the temperature control valves is dealt with in :

21-61-31 (A/T)

COLD AIR UNIT OUTLET ICE SENSOR TRANSDUCER - REMOVAL/INSTALLATION

1. General

The removal/installation of the Cold Air Unit Outlet Ice Sensor Transducer is dealt with in :

21-61-32 (R/I)

COLD AIR UNIT OUTLET ICE SENSOR/TRANSDUCER
ADJUSTMENT/TEST

1. General

The adjustment/test of the cold air unit outlet ice sensor transducer of air conditioning groups 3 and 4 is dealt with in 21-61-32, Adjustment/Test.

Printed in England

COLD AIR UNIT OUTLET TEMPERATURE SENSOR
REMOVAL/INSTALLATION

1. General

The removal/installation of cold air unit outlet temperature sensors 3D166 of air conditioning group 3 and 4D166 of group 4 is dealt with in
21-61-34, Removal/Installation.

Printed in England

WING MINI-MAXI TEMPERATURE SENSOR REMOVAL/INSTALLATION

1. General

The removal/installation of the wing mini-maxi temperature sensor of air conditioning group 3 is dealt with in 21-61-35, Removal/Installation.

WING MINI-MAXI TEMPERATURE SENSOR REMOVAL/INSTALLATION

1. General

The removal/installation of the wing mini-maxi temperature sensor of air conditioning group 4 is dealt with in 21-61-35, Removal/Installation.

SEMI-AUTOMATIC TEMPERATURE SENSOR - REMOVAL/INSTALLATION

1. General

The Removal/Installation of semi-automatic temperature sensor
R H1066 is dealt with in :
21-61-36, Removal/Installation

SEMI-AUTOMATIC TEMPERATURE SENSOR - REMOVAL/INSTALLATION

1. General

The Removal/Installation of semi-automatic temperature sensor H1067 is dealt with in :

21-61-36, Removal/Installation

Printed in England

COLD AIR UNIT OUTLET ICE SENSOR GRILLE - REMOVAL/INSTALLATION

1. General

The removal/installation of the cold air unit outlet ice sensor grilles is dealt with in :

21-61-33 (R/I)

Printed in England

COLD AIR UNIT INLET TEMPERATURE SENSOR REMOVAL/INSTALLATION

1. General

The removal/installation of the cold air unit inlet temperature sensors of air conditioning groups 3 and 4 is dealt with in 21-61-37, Removal/Installation.

END OF THIS SECTION

NEXT